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AMERICAN
GAS JOURNAL
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Manufactured and Natural Gas

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AMERICAN
GAS JOURNAL
Established 1859 — *Pioneer of the Gas Industry*

Manufactured and Natural Gas

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MAY 14 1932

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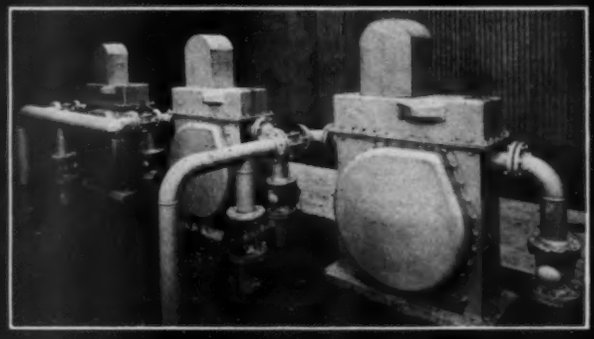

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A CONTRACTOR'S bid on a 60-mile section of 6-inch oil line was so low that the oil company investigated. They found that, because he used Lindewelding, he would save from 30 to 60 per cent. in welding time and 35 to 40 per cent. in welding material. Tests proved that Lindewelded joints were stronger than joints made by other methods. He got the job.

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Lindewelding technique differs from neutral flame welding technique in that it employs a special rod, a special flame adjustment, and the "backhand" method of blowpipe manipulation. The actual steps in making a Lindewelded joint are shown in our motion picture, "The Lindeweld Process for Pipe Line Construction." This picture will be loaned free of charge to pipe line officials and welding or engineering societies. It is furnished in 16 mm. and 35 mm. safety film and can be obtained by writing to any Linde District Office.

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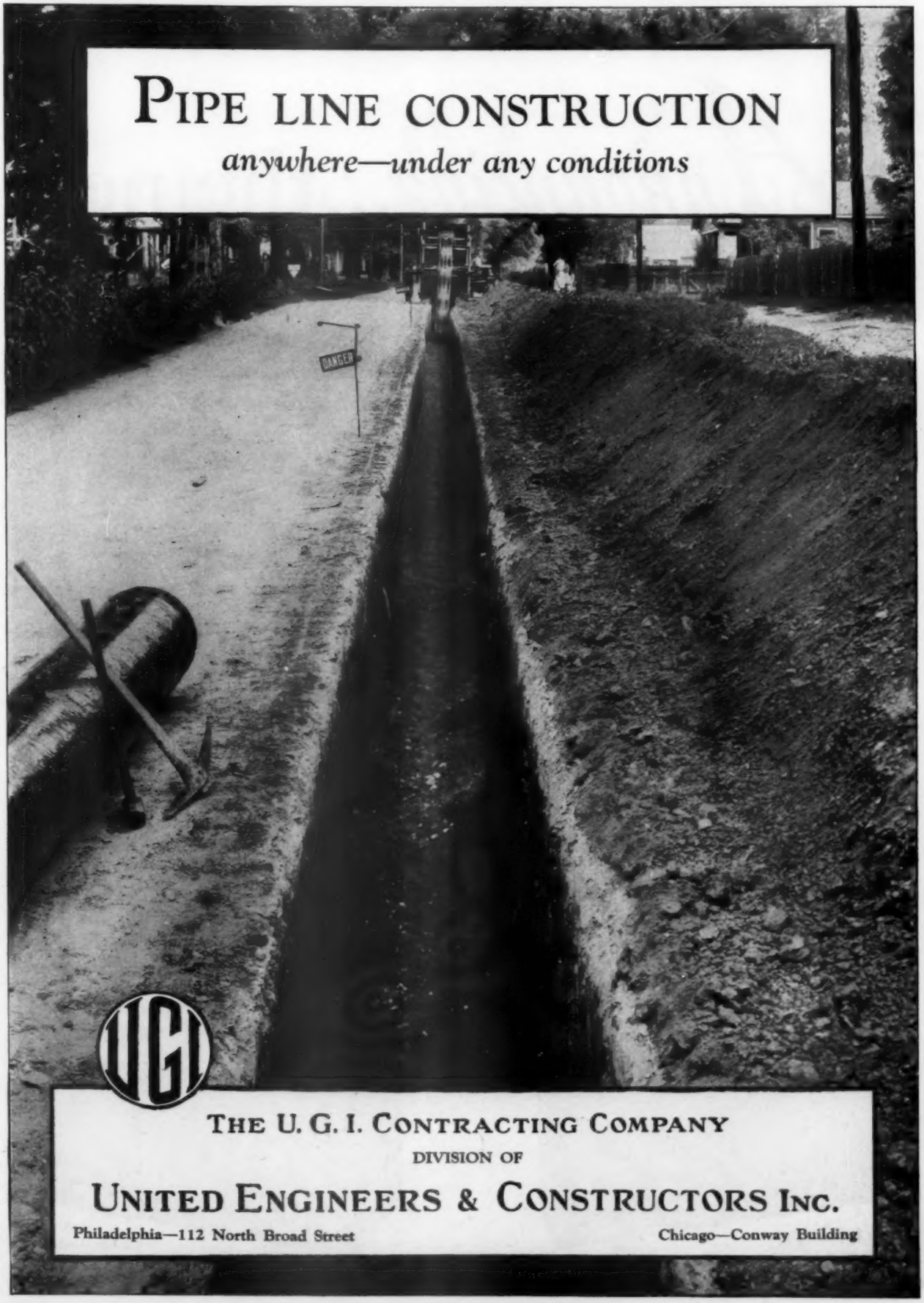
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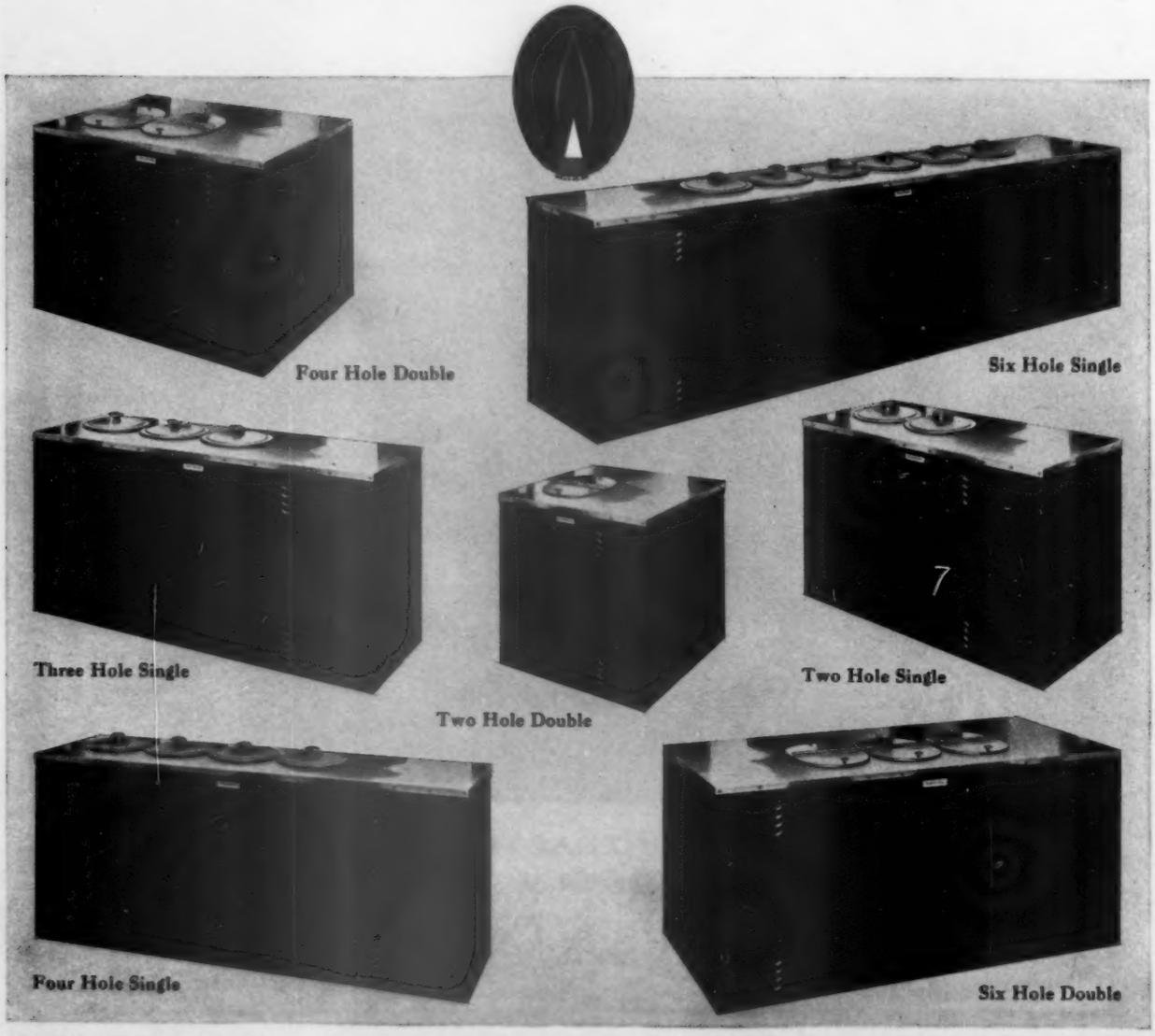
Seven Ice Cream Cabinets equipped with the same revolutionary chilling unit that has made Electrolux domestic models the choice for over a quarter of a million fine homes and apartments.



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NOW—a complete line of Electrolux Ice Cream Cabinets to add more MCFs to your load! And Electrolux Ice Cream Cabinets are the only ice cream cabinets on the market that operate WITHOUT MACHINERY.

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You can increase your profits—boost your load—with Electrolux Ice Cream Cabinets just as you have done with Electrolux domestic models. Right now plan to incorporate this commercial line in your Electrolux sales effort for 1932. For complete details, just fill out coupon below. Electrolux Refrigerator Sales, Inc., Evansville, Ind.

ELECTROLUX
THE *Gas* REFRIGERATOR

ELECTROLUX REFRIGERATOR SALES, INC.
Evansville, Ind.

GENTLEMEN: Please send me your illustrated catalogue on Electrolux Ice Cream Cabinets.

Name.....

Address.....

.....

PROTECT
YOUR FUTURE GAS MARKETS

There was a time when there was no practical way to protect your unserved territory from competition and preserve it for your future expansion. That time is gone—for today there is "bottled gas."

Philgas Company, through its own marketing organization is cooperating very closely with many gas utilities in the protection of outlying territory—by means of Philgas Service—an exact duplication of city gas service for homes beyond gas mains.

In addition, there are many responsible distributors of Philgas Company's commercial propane—and numerous other manufacturers and distributors of bottled gas—all engaged in the preservation of your potential gas cooking and water heating markets.

The "bottled gas" industry merits your support. May we discuss the advantages of cooperation?

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PHILGAS COMPANY

(SUBSIDIARY OF PHILLIPS PETROLEUM CO.)

GENERAL MOTORS BLDG.
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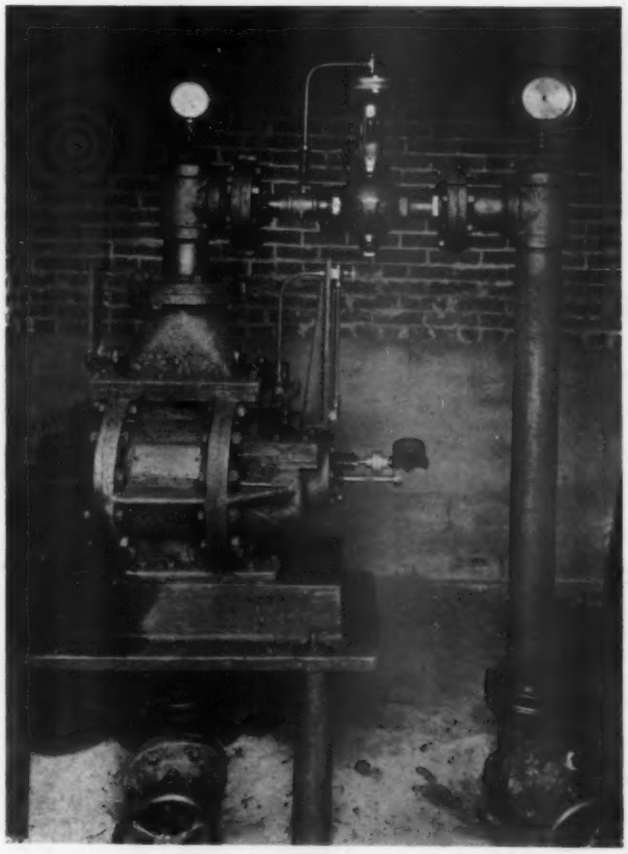
CONNERSVILLE METERS



DEPENDABLE AND ACCURATE AT CITY GATES

Connersville High Pressure Meter at city gate of Brazil, Ind., metering gas from Terre Haute.

DEPENDABLE and Accurate—these are two qualities of prime importance in metering gas at City Gates. These qualities have gained wide acceptance for Connersville Meters. Dependable, because of their sturdy but simple construction, and the absence of delicate parts which require frequent adjustment or replacement. Accurate, because the unit of measurement is fixed by carefully machined cast iron surfaces, which can not be altered in the field. Connersville Meters are motivated by the line pressure, and do not require any other source of power. At normal ratings, differential loss is less than 1 inch water column, and frequently runs lower. Literature mailed on request.

ROOTS-CONNERSVILLE-WILBRAHAM

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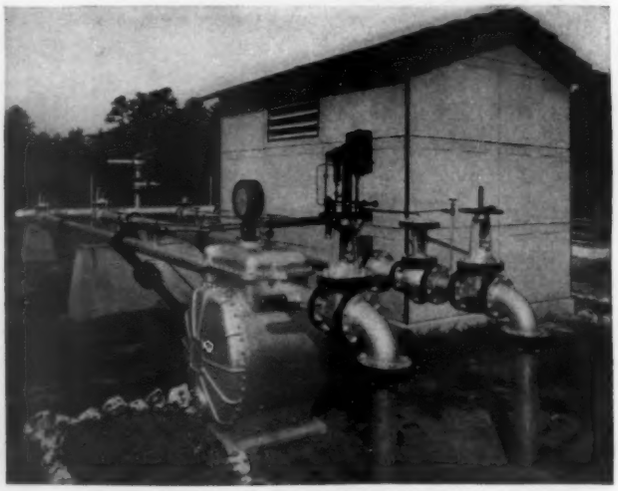
20 N. WACKER DRIVE
CHICAGO, ILL.

420 LEXINGTON AVE.
NEW YORK, N. Y.

This Load Varies 5,000%

. . Yet the Metric Differential Valve Permits It to be Measured Accurately



A boiler load that varies from 2,000 to 100,000 cubic feet per hour is measured by this installation . . .

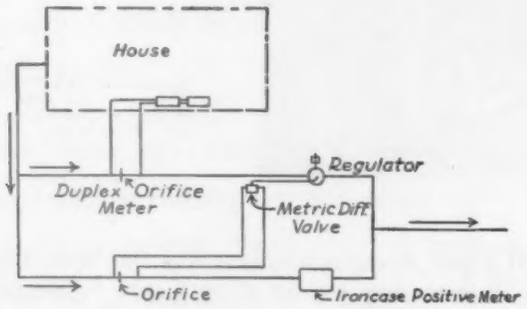


Diagram of the Installation.

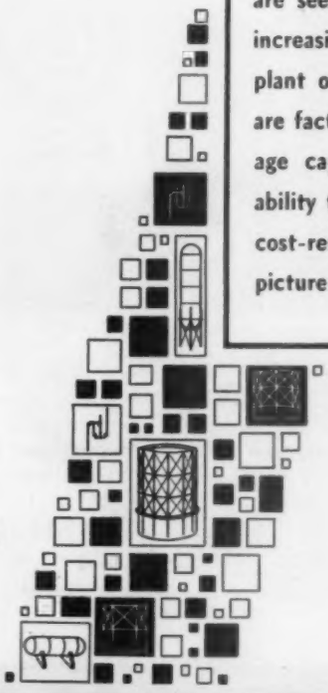
The equipment consists of one 500-B Ironcase Meter in combination with a 100" and 10" duplex Westcott Orifice Meter, and a Metric Differential Valve. The latter automatically cuts in and cuts out the Orifice Meter for high loads and low loads. Thus the Metric Ironcase Meter measures the low loads, the Westcott Orifice Meter and the Ironcase Meter together measure the peak loads. The Metric differential Valve and its functions are completely described by American Meter Co. Bulletin E-17. This will be sent on request.

METRIC METAL WORKS *ERIE, PENNSYLVANIA*

AMERICAN METER COMPANY
INCORPORATED
Established 1836
GENERAL OFFICES : 105 W. 40TH STREET · NEW YORK, N.Y.

NEW HOLDERS
WILL BE BUILT BY
CRUSE-KEMPER

It is not only faith in the inevitable recovery of American industry that prompts us to picture a number of new storage units in erection in the not far-distant future. It is something more substantial. The way that the Gas Industry has held its own through recent months, the energy with which gas companies are seeking new uses for their product, the increasing willingness on the part of industrial plant owners to consider gas as fuel—these are factors behind the growing need for storage capacity. Add Cruse-Kemper's known ability to build the very best of Holders with cost-reducing efficiency, and you have our picture of tomorrow.



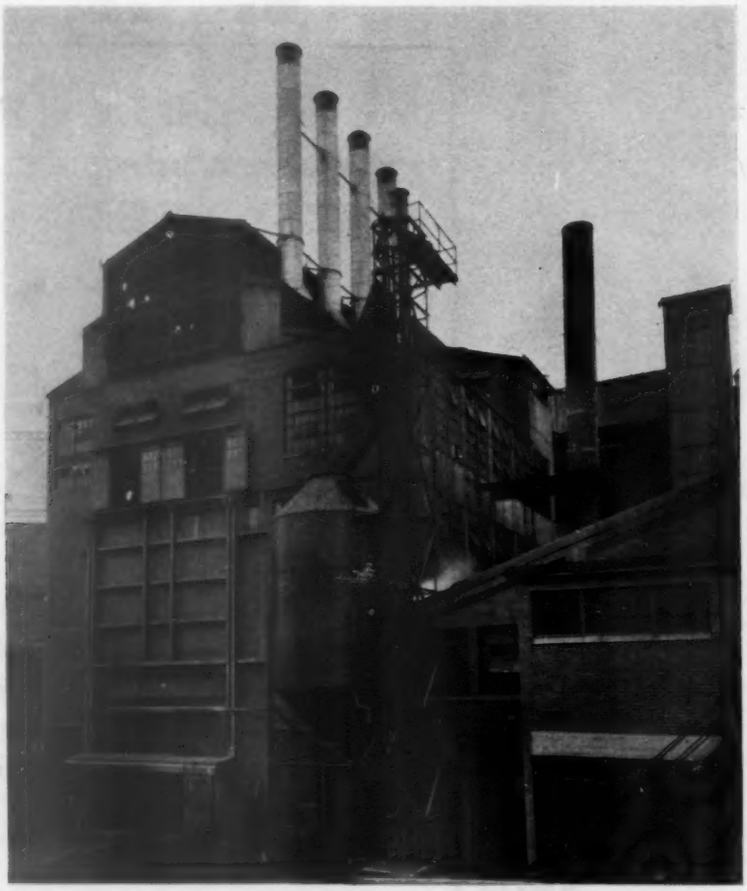
Manufacturers of GAS HOLDERS and other major equipment units for the GAS INDUSTRY

CRUSE-KEMPER CO.
AMBLER, PA.

GREATER ECONOMY

in

ALL CONDITIONS
REGARDLESS
OF SIZE



There are over 300 installations in all parts of the World, successfully carbonizing all classes of coal and ranging in capacity from 100,000 to 17½ million cubic feet per day

IN these days, executives and engineers can wisely consider the exceptional operating economies of Glover-West vertical retorts.

More than 300 installations of the Glover-West System of carbonization have been built and each of these installations has demonstrated its ability to operate at minimum cost, regardless of size of plant or working conditions.

This economy is partly due to the fact that the heat of outgoing coke is used for preheating the secondary air; heat from waste gases is recovered and used to warm incoming coal and to operate a waste heat boiler. Heat from radiation is minimized by the free use of insulation on the benches. All this saves producer fuel and lowers manufacturing costs.

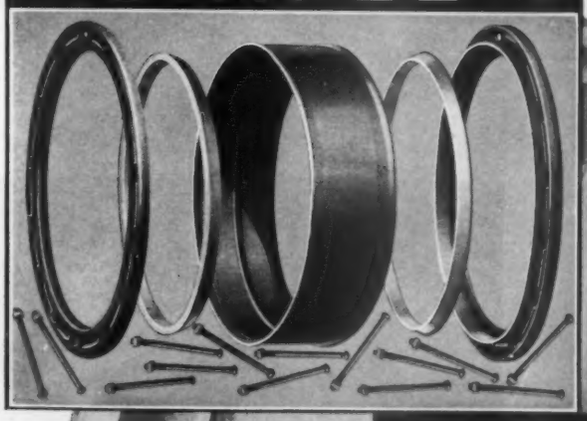
The advantages of Glover-West vertical retorts are real and worth investigating.

WEST GAS IMPROVEMENT CO.

BUILDERS OF COAL GAS PLANTS

441 Lexington Ave., New York

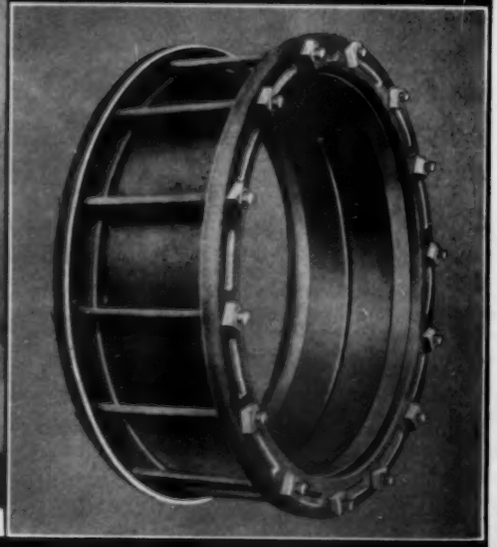
SIMPLE



IT'S so easy to join two lengths of pipe with a Dresser Coupling . . . the job's done almost before you can describe it! A flange and a gasket slip over each pipe-end. The middle ring goes in between. Then these parts are moved together. The bolts are inserted and drawn up evenly all around. And there you are! You have a joint that will remain absolutely and permanently tight for the life of the pipe. Besides promoting rapid laying of permanent lines, Dresser Couplings are equally advantageous for temporary installations. They can be easily taken up and re-established elsewhere with practically no loss of material.

SPEEDY

TIGHT



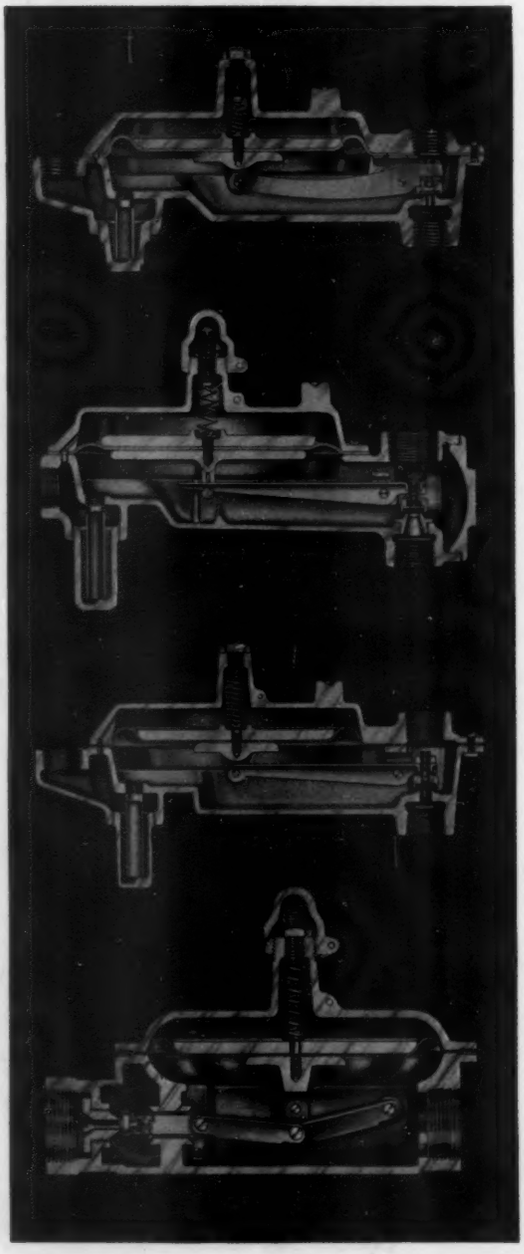
Wherever a big gas main or a long-distance line is laid in record time . . . or wherever the going is rough or the need for strong, flexible, durable joints is imperative—Dresser Couplings dominate. "Dressered" lines provide for all movements due to expansion, contraction, shifting ground, vibration and other strains. Maintenance is nil.

S. R. DRESSER MANUFACTURING CO.
BRADFORD, PA.
CANADA—Dresser Manufacturing Company, Ltd.
28 Front Street, W., Toronto, Ontario

DRESSER COUPLINGS DOMINATE!

REYNOLDS

4 SERVICE REGULATORS



● Reynolds Service Regulators are manufactured by a company that upholds the tradition that years of satisfactory operating performance is the true gauge for measuring a product. The hundreds of thousands of Reynolds units giving A-1 performance today attest this fact. The four models are specifically built to fit the needs of this particular branch of the Gas Control Field. Models 0, 10, 20 or 30 are factory tested through a maximum range of possible conditions before they are okayed as a finished job and sent to you. The workmanship is that of men who have had years of training and experience in the Gas Control Field. The materials used are first grade, closely examined and accurately machined before they are ever assembled into a complete unit. You can be sure that a Reynolds Regulator will give as accurate delivery, positive control, and dependable performance as is possible on the installation for which it is recommended. The co-operation of Reynolds Engineers with the trade is a personal service and one that has helped give Reynolds Units precedent. Reynolds men are always ready to help gas men in the field work out their gas control problems. Write them for details and information about this co-operation.

● REYNOLDS PRODUCTS

FOR ALL KINDS OF PRESSURE REDUCTIONS —FOR EITHER ARTIFICIAL OR NATURAL GAS

GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street. **REGULATORS**—High Pressure Service, Low Pressure Service, Intermediate Pressure, High Pressure Line, Single and Double District Station. **VALVES**—Automatic Quick Closing Anti-Vacuum, Relief, Cut-Off. **SEALS**—Mercury and Dead Weight. • **Model 30** manufactured for vertical or horizontal installation.

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Reynolds

REYNOLDS GAS REGULATOR COMPANY

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RECOGNIZED GAS CONTROL SINCE 1892

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for a high pressure gas line

ANOTHER of the rapidly mounting number of installations of cast iron pipe with *mechanical joints* for high-pressure gas service. Photograph shows lowering and entering of pipe preliminary to adjusting and bolting the mechanical joint.

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The joints used are based on the "stuffing-box" principle employing rubber gaskets with follower rings. This principle is embodied in several designs of mechanical joints made by members of The Cast Iron Pipe Research Association. In field tests, and in actual service under medium and high pressures, it has been conclusively demonstrated that these joints are *gas-tight*.

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CAST Q IRON

Look for the "Q-check" symbol as shown above. It is the registered trademark of The Cast Iron Pipe Research Association.

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CAST IRON PIPE

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SUBSIDIARY COMPANY: THE WESTERN GAS CONSTRUCTION CO., FT. WAYNE, IND.

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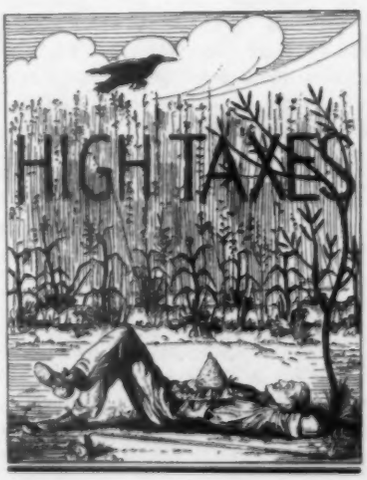
AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900.

HENRY M. RILEY, Editor

Exerting Influence to Secure Tax Reduction

TAX LEVIES are never popular. But official spending for things in which we are interested is always welcome. This unfortunate combination of facts lies at the root of most political difficulty being experienced today by honest and earnest legislators seeking public economies. Every American citizen today must help solve this problem or the burden of taxes is bound to increase even further.

In Federal matters the relationship between taxes and spending is not materially different than in state or local affairs. Everyone wants the other fellow's property to pay most of the bills; and yet we each ask to have the finest service, the newest of public buildings, the smoothest of pavements, and the other public expenditures all favorably arranged with reference to our own home, business or course of travel. We presume that gas company executives and the many thousands of gas company employees are no exception to this rule. But we do believe that they are exceptionally able to appreciate the seriousness of the problem which confronts the nation today. They should, therefore, be most easily persuaded as to the proper remedy.



The remedy is simple. Each one must stop demanding more service, more roads and more buildings for his particular neighborhood; and he must use his influence to relieve similar pressure in other neighborhoods on the part of other people.

Quoting from a letter recently sent out by the National Founders Association to its members: "Are you going to do your part in this, or are you going to sit on the sidelines and watch your taxes grow? If you are going to help, see to it that no organization of which you are a member, Chamber of Commerce, Manufacturers' club, Civic organization, requests any representative to back legislation calling for an increase in appropriations. Don't preach economy for everything except the particular extravagance in which you are interested; see to it that your representatives in local, state, and Federal government thoroughly understand your position in favor of decreased expenditure. Don't make the mistake of thinking they can read your mind. If you don't know your representatives, get acquainted with them."

If this influence is not exerted in every proper way, we shall force legislative measures of grossly socialistic consequence. Our political representatives in city councils, state legislatures, and the Federal Congress do not want to vote such things. They will be greatly relieved if the pressure from every political quarter can only be lightened. Sanity rather than selfishness must govern.

May
1932

As We See It

Gas Industry Wakens Uncle Sam from His Nap

UNCLE SAM has been having a regular Rip Van Winkle nap in the matter of fuel supply for his multitude of institutions and establishments. He needed badly to be wakened. The gas men have done this by appointing in Washington a new representative who is most capably and effectively selling the idea of gas for use in public buildings.

Some of the accomplishments and some of the opportunities in this matter are described in an article published in this issue of the Journal. We trust that every executive will study the situation described in order to avail himself of it.

And it is likely that we shall gain much more than the *direct* business of Uncle Sam. This latter is large, because several billion dollars are being spent on public buildings at this time. But the influence of the acceptance of gas for such establishments will go ever further in encouraging other purchasers. Architects and engineers will see successful applications and will imitate them in private construction. The public visiting the buildings will recognize that Uncle Sam's discriminating judgment in the choice of gas means that they too should use this modern fuel. The influence of all will be for the benefit of all. What more could we ask

Would You Believe It?

IN the current issue of Woman's Home Companion we note a well written article extolling the merits of electric cooking. Accompanying this dissertation is a sketch carrying a caption to the effect that the housewife can save cooking costs by way of preparing an over-size meal and selling a portion of it to a neighbor.

Picture some possible consequences of the growth of such a practice. Mrs. Perrybingle stews up, along with her regular meal, a well-meaning skillet of tripes for the gastronomic delectation and ultimate nourishment of one, Mrs. Trotty Veck. In turn, the latter bakes a buxom three layer cake for Mrs. Waxpool, who whisks out a goodly length of parboiled chitterlings for Mrs. Bangs across the street. And so the food courses through the village. Perhaps Mr. Veck's stomach rebels at tripes and the Waxpool children, as is generally the case, gorge on anything called cake. Further, it is quite possible that Grandma Bangs cannot make much headway with chitterlings, what with her store teeth and superfluous acid condition. At all events there is recourse, on a quantity basis, to the bicarbonate box; neighborhood amity is knocked into a cocked hat; a moratorium is declared all around—and savings resolve into merely a Scotch dream.

Community cooking, we hope and believe, will never be hilariously popular and any savings in cooking costs effected by this method bid fair to make the "widow's mite" look like a Polish money lender's bank account in comparison.

We may thump our elbows and bark our shins in the competition for the cooking load but it seems that there will be a few belly laughs here and there to ease the pain.

A Fine Prospect

COMPETENT ESTIMATES point to the construction of three million homes in a space of five years and, although the start of such work is predicated on the upturn of business, it is nevertheless a splendid prospect to think about and plan for.

On the basis of sixty per cent of these homes being erected in districts served by gas mains, we can readily visualize potential customers for upwards of two million gas ranges, a like number of water heaters, numerous househeating installations and many other gas appliances. But, over and above this phase, we can estimate the increase in gas usage per meter, which is intriguing to say the least.

However, it must be borne in mind that we shall probably see a back-to-the-suburbs movement, once building gets under way. This obviously means less customers per mile of main. Consequently, in order to maintain the proper balance, we must cultivate the customer more diligently, to the end that sales per meter will increase. Careful planning, modern appliances with the economic operation feature, compelling advertising and vigorous selling are the requisites that will enable us to secure the maximum return from any extensive home building program.

We must be entirely prepared to swing into the upturn of business with the proper stride. Behind us must be any deterring mistakes, for growing competition feeds fat on blunders. And now is an excellent time to lay our plans and to sharpen our spikes for the race that is virtually made to order for us.

An All-Gas Hospital

This Veterans Hospital at Waco, Texas, uses approximately 70,000,000 cubic feet of natural gas per year at 19.5 cents per M. This represents only one of many hospitals where the Government should become a customer of the industry.

Cooperation is Making Uncle Sam a Gas User

New Washington representative of A. G. A. demonstrates valuable results for every utility company and every equipment builder.

R. S. McBRIDE,

Consulting Editor, American Gas Journal

UNCLE SAM is potentially one of the greatest gas customers in this country. This fact has apparently been completely ignored by our industry until recent weeks. But with the appointment in Washington of an A.G.A. representative to deal with gas using problems of the Government, almost unbelievably fine results are already being achieved.

In these days of Government "economy," taxation reform, and like front page newspaper subpects, we all know more about the spending activities of the Federal Government. But the gas men have not previously understood how big a potential spender it is for essentially government operations. Nor has it been realized that literally billions of cubic feet of gas should be used in Federal institutions scattered throughout the United States. There is most convincing evidence of this potential market in the achievements of our new A.G.A. Washington representative, Mr. George W. Bean, who already has perfected plans calling for fully 300,000,000 cubic feet a year of additional gas sales. And this represents only a beginning of the results of less than a month's well directed, well planned effort.

Uncle Sam has been using an antiquated gas kitchen with three times the equipment now needed as the basis of his judgment of the performance of gaseous fuel. Simultaneously, he has been assuming that the efficiencies of the so-called "electric kitchen" were typical although nine-tenths of the service there was actually done by steam. A damaging comparison, unfavorable to gas, was inevitable. A correction of this situation is being accomplished in Washington. We wonder whether in many cities equally fallacious conclusions are not being drawn because gas men are allowing out-of-date, ineffective installations to be their unofficial representatives. Every company should look into this sort of thing thoroughly.—R. S. M.

THE appointment of Mr. Bean was arranged through the cooperation of the Manufacturers Section with the headquarters staff of A.G.A. His appointment is based on the desire more thoroughly to acquaint the government architectural and specifications departments with the modern uses of gas. For years these government executives have been told the story of coal, oil, and electricity; but no organized effort has heretofore been made by gas men. As a consequence, in many government establishments, and these are scattered throughout the entire United States, wonderful opportunities for service by gas have not been realized either by

the industry itself or by the government engineers and architects. The reception of Mr. Bean as an emissary of the industry in Washington has been most cordial. Already three outstanding accomplishments can be named.

1. The War Department has already appointed on its staff a gas engineer. It will be the duty of this man to investigate problems of gas utilization at the numerous Army posts and other stations where the wide-flung activities of this department are located.

2. A definite program of comparative tests for cooking with gas and with other energy supplies is being arranged by the Superintendent of Public Buildings and Grounds. (More of this later.)

3. Definite contracts have already been arranged to install gas using equipment in new construction work of the Veterans Administration which will require an annual consumption of approximately 360,000,000 cubic feet of gas per year. (And this is but a start, even in this single government bureau.)

THIS actual "selling" of gas to the engineering and executive officials of the Veterans Administration is, of course, a most welcome evidence of the open-mindedness of these gentlemen with respect to government construction activities. The new hospital now being designed for Fayetteville, Arkansas, will, for example, have a complete gas installation. Its fuel requirement will be approximately 97,000,000 cubic feet of natural gas per year. Another mid-western hospital now in design stage will require 100,000,000 cubic feet, and a third somewhat farther west is expected to use 162,000,000 cubic feet per year. Three jobs alone thus account for a gas requirement of more than 10,000,000 cubic feet per day, business enough for a good size city. And this business would all have been lost to other fuels if intelligent, well-directed effort of the industry had not been made *at the right time*.

This matter of timing efforts to secure proper results is extremely important to the industry. It can well be understood that it is much easier to sell gas to the design and planning officials in the first place, rather than to change them away from some other fuel program and secure the adoption of gas at a later date. Much of the opportunity for securing the effective early action lies with the gas men themselves. They will know from their local newspapers when it is planned to have government establishments located within the area served by their companies. Oftentimes they will read of such plans even before legislative or administrative decision has been reached. It is important that A.G.A. headquarters be advised of such proposals at once when local notice is given of them. Then staff arrangements can be made to follow through in Washington on needed contacts to secure fair and sympathetic attention for the proposals to use gas. No local management should ignore this opportunity for securing helpful guidance in Washington. It is there for the asking; and it insures a real opportunity to be heard at the time when the story of gas can be told effectively.

OF course, the Washington representative of A.G.A. in these matters cannot become the emissary or salesman of any single appliance company. He cannot be expected to go around and sell Mr. Jones' cook stoves or Mr. Smith's water heaters in competition with the other products made by other member companies. But if Mr. Smith or Mr. Jones will get on the train and go down to Washington at the right time, it is part of the A.G.A. job to see that they meet the right official under conditions which will enable them to get a sympathetic hearing for their proposals. The individual manufacturer certainly can ask no more than this.

In the case of individual gas companies, however, there is not the element of competition. Hence, when their problems must be taken up individually with respect to specific government construction work, the Washington representative of A.G.A. stands ready to go with them in their conferences regarding contracts for gas supply.

This general plan insures quick action for either gas man or equipment company representative. By prearrangement, the proper appointments will have been made; the men who have authority to say "yes" or "no" will be available; and a single day will often suffice to secure results that the stranger to Washington might not achieve in a week wandering in the mazes of government red tape. Working through the Washington office has, therefore, advantage for all concerned.

The Government is a shrewd buyer. This fact is well known to companies who undertake to sell their materials or their equipment under the competitive bidding system that customarily prevails. It is extremely fortunate, therefore, that the second accomplishment above named should have placed gas in a position to demonstrate its real merit. And at the very outset, it is amusing to see how little has been the appreciation of the facts affecting gas cooking or gas water heating hitherto. Take only one example of this.

THERE are in Washington, among others, two particular lunchroom cafeteria kitchens that have been compared on the assumption that they would afford some information as to the relative advantage of gas and of electricity. The gas equipped kitchen was built during the War time. It has in it nearly three times as many gas appliances as are now needed for the number of meals served. In most respects, it was an out-of-date, inefficient, and wholly unsuitable representative of the industry. And yet it was serving as the basis of comparison. The electric kitchen considered was claimed to serve one meal for each kilowatt hour of current consumed. The ratio was, presumably, correctly calculated; but the ratio did not show that more than nine-tenths of the cooking was actually being done by steam taken free from the building supply, unmetered and unconsidered in the comparison. It is not strange that officials in charge of public buildings had the impression that gas was more expensive than electricity. The former was used about three times as generously as was necessary and the latter was doing but 10 per cent of the work with which it was credited.

Now, a precise comparison is being planned. Equipment manufacturers are installing in the old War time cafeteria a modern set of appliances that will be sized to suit the job. They will be adjusted and, presumably, operated fairly to picture the service which gaseous fuel can give. And in the so-called "electric kitchen" meters are being put on the steam and individual electric meters on each of the unit devices that actually receive power. Facts will, therefore, shortly be available to determine how many kilowatt hours are needed to do the work of a million B.t.u. in gas. Every well informed gas man can confidently expect that the results are going to be very favorable for our favored fuel.

And when these results are available, they are going to be accepted by a large number of government departments in determining kitchen and water heating policies that should apply to new or remodeled installations elsewhere. Wherever gas deserves the business, it is almost

(Continued on page 30)

Fuels Consumed by the Government

THE Bureau of Mines has recently issued Information Circular 6571 which discusses and itemizes the kinds of fuel used by the United States Government, as well as giving the departmental and geographical distribution of these fuels. This circular should be of considerable interest to gas men, especially in view of new avenues for gas use which might be opened.

There follows an excerpt from the circular in question and a somewhat detailed tabulation from the same is also given.

The War Department, Treasury Department and Vet-

Fuels Consumed by the Federal Government During the Fiscal Year 1930
By States

States	Anthracite, net tons	Bituminous coal, net tons	Coke, net tons	Oil: Furnace oil, gallons	Oil: Fuel oil, Bunker A, barrels	Oil: Fuel oil, Bunker C, barrels	Gas, thousands of cubic feet: Manufactured	Gas, thousands of cubic feet: Natural	Gas, thousands of cubic feet: Mixed	Other fuels: Wood, cords	Other fuels: Kerosene, gallons	Other fuels: Briquets, net tons	Other fuels: Charcoal, net tons
Alabama	150	25,725	116	.....	.....	447,275	1,465	.....	.....	3	2,069	.....	....
Alaska	78	64,352	.....	.....	74	30,467	.....	.....	.....	108	5,532	16	....
Arizona	600	32,809	.....	5,040	.....	25,015	5,898	.....	.....	9,427	.....	.....	....
Arkansas	.....	4,752	.....	.....	.....	.....	.....	69,469	.....	12	50	.....	....
California	165	14,122	583	34,772	45,044	3,600,930	113,689	143,560	8,280	3,417	16,137	.....	....
Colorado	547	39,770	30	1,000	.....	9	.....	251,271	.....	457	.....	.....	....
Connecticut	673	3,993	.....	48,875	334,643	.....	2,770	.....	.....	1	.....	.....	....
Delaware	1,403	4,010	.....	6,000	.....	31	.....	.....	.....	94	716	.....	....
District of Col.	11,391	336,583	444	30,438	63,663	149,818	26,849	.....	.....	528	254	.....	23
Florida	157	18,675	62	.....	5,678	176,598	2,299	.....	.....	692	4,662	.....	....
Georgia	364	60,133	239	.....	.....	80,509	278	8,374	.....	895	1,656	.....	....
Hawaii	.....	13,860	.....	.....	.....	190,241	12,055	.....	.....	788	126,612	.....	....
Idaho	.....	5,377	.....	2,500	.....	.....	308	.....	.....	42	.....	.....	....
Illinois	778	163,441	170	2,250	1,400	16,721	35,830	.....	.....	51	1,872	.....	....
Indiana	39	33,258	53	.....	.....	155	11,132	.....	.....	.....	.....	.....	....
Iowa	.....	22,238	108	.....	.....	.....	5,091	.....	.....	143	56	.....	....
Kansas	.....	27,084	.....	.....	.....	150,683	570	727,558	.....	295	.....	.....	....
Kentucky	28	42,136	33	664,607	.....	4	10	4,834	.....	37	.....	.....	....
Louisiana	306	36,989	6	27,010	1,290	1,764,030	536	55,330	.....	10	14,879	.....	....
Maine	2,652	21,729	.....	.....	.....	9,775	1,733	.....	.....	184	.....	.....	....
Maryland	6,957	152,476	203	.....	18,083	128,971	558	.....	44	466	12,668	.....	....
Massachusetts	4,966	75,843	92	22,732	184,245	93,430	12,127	.....	.....	200	1,383	.....	....
Michigan	1,453	40,758	569	13,237	.....	.....	4,582	.....	.....	438	.....	.....	....
Minnesota	149	40,330	1	4,420	.....	.....	929	.....	.....	1,114	.....	1,345	....
Mississippi	46	42,40[1]	.....	1,100	.....	20,790	1,743	2,928	.....	284	7,872	.....	....
Missouri	.....	56,223	188	146,175	.....	77,509	1,712	18,245	.....	40	.....	.....	....
Montana	1	16,301	.....	1,000	.....	.....	675	12,934	.....	990	.....	.....	....
Nebraska	5	15,189	86	2,800	6,392	6,729	4,752	.....	.....	110	.....	.....	....
Nevada	15	1,959	2	8,346	.....	162	17	.....	.....	708	300	.....	....
New Hampshire	889	21,967	330	.....	.....	.....	.....	.....	.....	72	.....	.....	....
New Jersey	6,404	49,672	159	4,000	1,373	590	1,867	.....	.....	204	5,490	.....	....
New Mexico	1,511	28,278	30	19,068	.....	.....	3	70	.....	1,256	.....	.....	....
New York	90,783	221,677	1,248	132,781	244,308	1,318,309	74,523	1,013	.....	1,530	2,104	.....	1
North Carolina	410	36,211	230	.....	.....	7,671	.....	.....	.....	2,080	685	.....	....
North Dakota	107	12,550	.....	.....	.....	232	105	.....	.....	120	28	746	....
Ohio	226	96,399	175	.....	.....	.....	11,358	18,415	2,347	43	200	.....	....
Oklahoma	.....	9,354	5	.....	.....	.....	.....	392,816	.....	536	1,205	.....	....
Oregon	10	6,344	2	4,700	.....	133,187	2,888	.....	.....	10,787	255	.....	....
Panama C. Zone	.....	361,081	49	.....	.....	554,528	88,177	.....	.....	236	4,225	.....	66
Pennsylvania	12,939	168,223	723	205,550	171,593	761,762	56,831	7,078	1,145	40	4,501	.....	....
Porto Rico	.....	32	181	.....	.....	8,024	10,639	.....	.....	241	9,917	.....	....
Rhode Island	1,365	29,611	75	11,000	32,172	.....	.....	.....	.....	23	135	.....	....
South Carolina	672	35,749	120	.....	13,095	15,423	127	.....	.....	194	16,095	.....	....
South Dakota	365	25,365	15	2,716	.....	.....	2	81,246	.....	247	5,920	81	....
Tennessee	.....	63,690	4	6,959,618	.....	.....	975	10,400	.....	.....	.....	.....	....
Texas	568	27,609	54	58,183	2,328,203	1,759,139	.....	532,513	.....	13,953	2,139	.....	....
Utah	.....	7,474	151	.....	.....	.....	.....	1,380	.....	778	.....	.....	....
Vermont	2,882	4,079	.....	.....	.....	.....	21	.....	.....	192	37	.....	....
Virginia	2,898	256,773	1,226	.....	36,078	260,679	7,802	.....	.....	835	35,600	.....	....
Virgin Islands	.....	55	.....	.....	.....	12,725	.....	.....	.....	.....	.....	.....	....
Washington	24	51,887	437	17,529	.....	109,789	9,392	.....	.....	3,955	8,818	1,218	....
West Virginia	.....	5,687	.....	.....	.....	.....	.....	38,303	.....	.....	500	.....	....
Wisconsin	1,408	47,203	44	18,930	595	.....	8,652	.....	.....	812	4,350	31	....
Wyoming	.....	31,918	78	.....	.....	4,265	39	7,652	.....	573	1,282	.....	....
Undistributed[1]	.....	13,785	.....	.....	[2]247,251	586,790	.....	.....	.....	.....	2,790	.....	....
Total	156,384	3,025,279	8,321	8,456,377	3,735,180	12,502,965	521,009	2,385,389	11,816	60,241	302,994	3,437	90

[1] Includes purchases of coal and fuel oil by Inland Waterways Corporation; ships purchases by Navy Department; also kerosene purchased by the Coast and Geodetic Survey, Department of Commerce.

[2] Includes some Bunker C fuel oil, the exact amount not specified.

Coal tonnage in net tons of 2,000 pounds.

erans Administration were, in the order named, the largest consumers of anthracite, their combined consumption amounting to 65 per cent of the total.

The principal consumers of bituminous coal were, in order of quantity, the War, Navy, and Commerce Departments, the Panama Railroad, and the Veterans Administration. Together these five organizations accounted for 81 per cent of the total. Each of the 54 State and other destination territories represented in the report consumed some bituminous coal, athough in several the quantity was small.

Furnace oil consumed by the Government was used largely by the War Department, the next most important users being the Post Office and Treasury Departments. Fuel oil was used principally for ships bunkers by the Emergency Fleet Corporation of the Shipping Board, the Navy Department, and the War Department. Bunker oils were taken chiefly at the ports of Texas, California, Louisiana, and New York.

The quantity of gas consumed by the Government in the fiscal year 1930 amounted to 2,918,214,000 cubic feet, of which 81.7 per cent was natural gas, 17.8 per cent manufactured gas, and a small quantity of natural and manufactured gas mixed. The principal consumer of manufactured gas was the War Department which used 67 per cent of the total. The Veterans Administration and Treasury Department were next in importance.

The War Department was the largest consumer of natural gas, but important quantities were used also by the Veterans Administration, Department of the Interior, and the Treasury Department.

War and Interior Departments were the largest consumers of wood. In a number of cases the quantities stated are estimates.

The War Department used 57 per cent of the kerosene consumed by the Government. Other important users were the Department of Commerce and the Marine Corps.

The consumption of fuel briquets by the Government is relatively small. The only quantities of importance consumed during the period under review were used by the Department of the Interior and the War Department.

Those who may desire more specific and detailed information as to the fuel requirements of any particular building or plant, such as quality and other specifications, should communicate direct with the appropriate department or establishment indicated herein. Information in regard to the quantity and kind of fuel consumed at any particular location during the period covered by this report can be obtained from the department consuming the fuel or from the Bureau of Mines.

Gas Refrigerator in Historic Home

AT a time when the Nation is celebrating the Washington Bicentennial and our eyes are turned in retrospection to things colonial, it seems fitting to offer this brief story of one of Philadelphia's oldest, historical mansions.

This old house situated at 6316 Germantown Avenue, was built in 1760 and needless to say is rich in Revolutionary lore and redolent of association with the fathers of our country. For 172 years it has stood as an imposing example of Philadelphia colonial architecture. It is a three-story structure with walls of stone and plaster, two-and-a-half feet thick, containing many rooms. At the rear of the premises is a portion of stone fence which was used as a shelter and protection by the Colonial troops in the famous battle of Germantown.

Near this fence is a 125-year-old pear tree which still bears fruit. A Germantown boy of today can pick and eat pears from the same tree that yielded its fruit to the Revolutionary War veterans and their families.

In the rear of the lot one may see outbuildings which date from the year 1790 and were originally used as tanneries. The house was built by Peter Keyser, a clergyman of the Dunkard faith. It was purchased from his heirs in 1857 by Ellwood Johnson, descendant of a family which came to America with William Penn and helped found Germantown.

The present owner of the Johnson Mansion is Mrs. George C. Johnson, who is a granddaughter of the original purchaser. Her husband has been dead many years. Not being deaf to new ideas, Mrs. Johnson is an intensely alert young-old lady. She is a voracious reader and keeps abreast of modern ideas and movements. She lives comfortably in a historic atmosphere, using furniture that has been in the family for many generations. A grandfather's clock is so old that all trace of its origin has been lost.

In her reading Mrs. Johnson particularly notes the advertisements, and this accounts for a visit she paid to the Germantown office of the Philadelphia Gas Works Company recently. She announced that she was interested in an Electrolux Refrigerator. After having had it demonstrated and explained to her, she was sure of her choice.

Nat Shanklin, Electrolux Sales Supervisor, and F. P. Bradley, Electrolux salesman, who talked to her, claim little credit for making the sale. They say that Mrs. Johnson virtually sold the refrigerator to herself. The model she selected was an EA-8 because of the fact she entertains large numbers of guests and also approves of the savings made by quantity purchasing.

The Electrolux was installed in the dining room. When it came to finding a suitable spot for it, Supervisor Shanklin's ingenuity was put to the test. The walls of this room, as well as of all other rooms in the house, were literally covered with engravings and paintings that tell the story of old Germantown. It was finally decided to remove a valuable picture of Benjamin Franklin at the French Court to make room for the Electrolux. And there it stands, graciously mingling with furnishings of a century and a half ago.

The Electrolux cabinet of gleaming white first had to be subjected to a mellowing and darkening treatment to make it harmonize in appearance with its surrounding furniture. This matching of reddish-brown and smoky coloring almost impossible to describe was done to Mrs. Johnson's entire satisfaction.

Mrs. Johnson is naturally delighted with the performance of her Electrolux for since its installation this old landmark now reposes in an atmosphere of modern gas comfort. Where of yore milk and foods were kept cool in the cellar or springhouse, now they are kept unbelievably fresh and wholesale in an Electrolux Gas Refrigerator, and in place of the immense hearth and swinging crane, a modern gas range cooks the foods. Gas also supplies lighting which is a luxury compared to the tallow candles of the old days.

Truly past and present meet and mingle romantically in this house of history—thanks to modern gas service.

—W. F. O'Donnell, Philadelphia Gas Works Company.

Industrial Heating Processes

An outline of the benefits conferred by gas and some cost comparisons with oil and electricity

C. FOSTER CLARK

Industrial Dept., Detroit City Gas Company

Engines of America's Finest Automobiles are "run in" with Gas.

While the present article treats of savings effected by manufactured gas over oil and electricity it should be borne in mind that natural gas or mixed gas will show efficiencies equally attractive.—Editor.

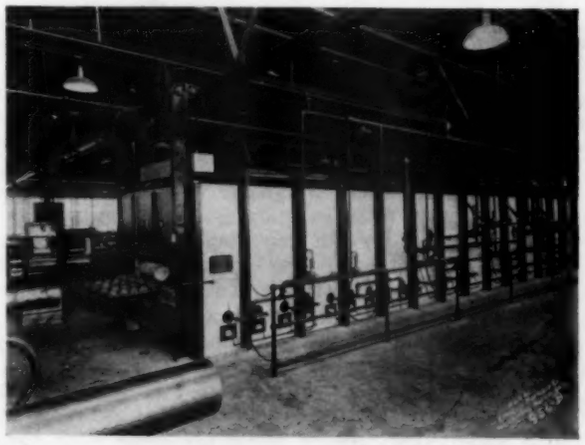
IN THE metal industries one of the greatest problems is that of scale. The removal of scale costs money and wastes material, as well as lengthening the time of process. This can now be overcome by the use of gas-fired heat treating furnaces, equipped with proper burners for the control of furnace atmosphere. With coal and oil fuel it is necessary to use an excess of air for combustion, which must form scale; if insufficient air is used the furnace will be smoky and fuel stratification will occur, so that even under such conditions the work will be exposed to a certain amount of air. With electric heat there is no protective furnace atmosphere unless gas is used for the purpose. Gas gives instant and positive control of furnace atmosphere and temperature at will, an inherent property of gas fuel.

Gas More Universal in Application

Control of temperatures and atmospheres in forging furnaces is impossible except with gas. Other fuels may do fairly well for rough work and electricity may give good control of temperature, though at a prohibitive cost, but none does everything with the exception of gas. Witness the present interest in luminous flame and diffusion type gas burners in the forging industry. With proper equipment, it is now possible to produce, for the first time, forgings absolutely free from scale in the furnace.

Old methods of carburizing are going by the boards with the development of a new gas-operated system, in which carburizing boxes and compound are eliminated, and a better case obtained. The work goes through a sealed alloy muffle, where it is exposed to the action of hydrocarbon gases, which carburize it perfectly. The product is clean when it comes from the furnace and is produced at a lower cost than by any other method.

Bright annealing of metals is often done with crude fuels, with the furnace chamber completely sealed from the combustion space and from the outside air, but the results are not satisfactory and the costs are high. It was thought that electric heat would solve the problem, especially by using a sealed muffle containing an atmosphere of gas or hydrogen, but this method was found to be hazardous and still incapable of producing a bright finish. With a newly developed type of gas furnace, it is now possible to obtain a perfectly bright product by a continuous method at a low cost and with no operating hazards.



Fifty-foot Continuous Pusher Type Billet Heating Furnace.

For years gas has been the favored fuel for the hardening of high speed steel tools, such as drills, broaches, cutters, hobs, and saws. With an increasing demand for better products, furnaces have been developed in which the tools are hardened in a controllable atmosphere, protected from the outside air and combustion gases by a muffle, sealed at the opening by an adjustable burning curtain of gas. The application of automatic temperature control to such a furnace makes the hardening of high speed steel an almost automatic operation.

Combustion Products Not Detrimental

The most modern method of industrial oven heating is by means of an external gas-fired recirculating heater. With gas fuel it is possible to deliver the combustion gases, together with the air required for processing, directly into the oven without detriment to the product. This is not possible with any other fuel.

Even the printing trade needs gas. A battery of Presses using Gas for the removal of Static Electricity from Printed Sheets.

Electric heat is clean, but has too many serious disadvantages to be used for this type of work. It is too slow to heat, does not give as uniform temperature distribution as does the gas-fired recirculating heater, is not as safe where inflammable vapors are present, and costs much more to operate. With the incinerating type of gas heater the inflammable vapors present in japanning or paint drying operations are completely burned; with the non-incinerating gas heater the oven atmosphere is so diluted with a rapid current of air that combustion cannot take place to cause an explosion or fire. Oven heating is uniform on account of the rapid circulation of heated air under pressure through all parts of the oven. Some of the most beautiful automobile finishes made are done with gas, at a cost lower than is possible by any other means.

After all, every manufacturer is interested in the fuel which will enable him to produce the best product at the lowest cost. The fact that gas may cost twice as much as oil for the same number of heat units will not prevent its use if the finished product can be made better at the same cost or equally as good at a lower cost.

Many Advantages

Gas has certain advantages over all other types of heating media which keeps its proportion of the industrial heating load continually on the increase. It is cleaner and easier to handle than solid or liquid fuels, is adaptable to close control of temperature and furnace atmosphere, and can be used in ways impossible with crude fuels. It is quicker to heat than electricity, an important factor in these days of production efficiency. Electricity can generate no flue gases, which is a distinct handicap in most modern heating processes, where these gases are used to create furnace pressures, to carry heat by convection, and to produce any desired furnace atmosphere. With modern control equipment it is possible to control temperatures more closely with gas than with any other source of heat.

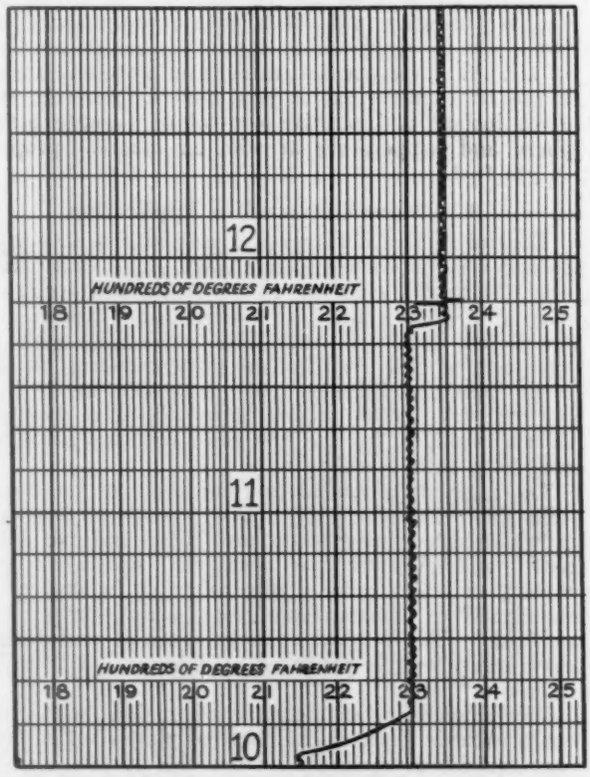
In comparing heating efficiencies of various fuels and electricity certain facts must be borne in mind. In any industrial heating process there are several sources of heat loss-radiation losses from the furnace or oven, heat carried out by the product and conveying equipment, losses due to incomplete combustion, and heat lost in flue gases. The first two items are common to all sources of heat energy; the latter two do not apply to electric heat. It may be said, then, that the chief difference in efficiency between fuels and electricity lies in the proportion of the total heat loss represented by the last two items.

With the modern types of gas burners and mixers now available it is possible to maintain practically one hundred per cent combustion efficiency, so that this loss may be disregarded when considering gas fuel. It does, however, assume serious proportions with solid or liquid fuels which, from their very nature, cannot be burned with great efficiency. A simple explanation for this fact is that all fuels must be converted to gas before combustion will take place; the liquid and solid fuels, therefore, must be preheated, gasified, and mixed with air before they will burn. These operations, all of which take place in the burner or burner block, involve a time lag and a decrease in efficiency. Gas, on the other hand, needs only to be mixed with air and burns at a much more rapid rate than other fuels.

The only loss, then, which is had with gas but not with electric heat is the heat lost in the flue gases. These losses may be readily computed for various furnace temperatures and a table set up showing the comparative efficiencies of gas and electricity at these temperatures, assuming complete conversion of electric power into heat.

Economy—The Proper Yardstick

Such comparisons, as a rule, show that the cost of electric heat is much higher than the cost of the same amount of useful heat with gas. Moreover, the term efficiency is not the one which should be employed, since



Temperature Record of Gas Fired High Speed Furnaces with Controlled Atmosphere.

profits are measured by economy rather than by efficiency. A heat treating furnace may run at extremely high efficiency, yet not be economical. For this reason the great amount of publicity given to electric furnace efficiencies is meaningless and without appeal to men of engineering ability.

So often, in making comparisons between electricity and fuels for heating operations, a modern, well-insulated, electric furnace is compared with an antiquated, uninsulated, fuel-fired unit, to the great enhancement of the former. It has been the writer's privilege to observe tests on similar or identical units recently in which no favor was shown to any form of heat. A short synopsis of the more important of these tests should be of interest.

Washing Machines

	Electric Heat	*Gas Heat*
Product	Small steel parts	Same as electric
Water capacity	120 gal.	140 gal.
Duration of test	7½ hrs.	8 hrs.
Wt. of pieces	9,737 lbs.	10,525 lbs.
Lbs. per hour	1,300	1,315
Ave. fuel per hr.	8 kw.	100 cu. ft.
Fuel rate	1.8c per kwh.	60c per 1,000 cu. ft.
Oper. cost per hr.	14.4c	6.0c

Both of these washers were new and were built by the same maker. The kind of work put through each was identical and the loading as nearly alike as possible. The electric unit has since been converted to gas.

Cyanide Pots

	Electric	*Gas*	*Oil*
Size pots	16 in. dia.	Same	Same
Oper. temp.	1550° F.	Same	Same
Product	Pinion shafts	Same	Same
Fuel rate	1¼c per kwh.	52c per 1,000	6c per gal. at burner
Cost per 100 shafts	$1.15	$ .85	$ .84

The electric cyanide furnaces were built especially for the operation, while the gas-fired units were made-over oil units. In spite of this, gas showed practically a cost parity with oil and both were considerably less expensive than electricity. The electric elements deteriorated rapidly on account of attack by cyanide fumes, while the pots in the oil-fired furnaces gave way long before those in the gas units, due to the action of the harsh oil flame on them. As a result this plant has now changed most of its cyanide pots to gas and is proceeding with the conversion of the remainder.

Stereotype Metal Melting

	Gas	*Electric*
Capacity of pot	8 tons	8 tons
Oper. temp.	605° F.	595° F.
Duration of test	6 days	6 days
Pieces cast	3,524	3,848
Wt. of pieces	281,920 lbs.	244,733 lbs.
Fuel per 1,000 lbs. metal cast	160 cu. ft.	15.5 kwh.
Fuel rate	60c per 1,000	1.8c per kwh.
Cost per 1,000 lbs. metal cast	9.6c	27.9c

The electric unit was more heavily insulated than the gas furnace and was able to hold up to casting temperature a trifle better. Had the gas furnace been of the most modern type it would have been able to hold temperatures closer during casting than the electric furnace.

Carburizing

	Gas	*Oil*	*Electric*
Investment	$ .12	$ .19	$ .19
Boxes or muffle	.04	.14	.14
Compound or gas	.01	.25	.25
Labor	.07	.17	.17
Fuel	.15	.10	.38
Maintenance	.02	.02	.01
Total cost per 100 lbs. product	$ .41	$ .87	$1.14

These costs are all figured on continuous furnaces of similar capacity, using unit fuel costs as follows: Gas at 60c per 1000 cu. ft.; oil at 5c per gallon at the burner; electricity at 1.3c per kilowatt-hour. In addition to the savings in cost, the gas furnace produces more uniformly carburized work, in a shorter time, and perfectly clean, without the use of carburizing boxes or compound.

Annealing

Cost of annealing castings at 1650° F.

Electric	*Gas*
242 kwh. per ton	2610 cu. ft. per ton
@ 1½c per kwh.	@ 60c per 1,000 cu. ft.
= $3.63 annealing cost per ton of product	= $1.56 annealing cost per ton of product

Bright Annealing

	Gas	*Electric*
Product	Spooled copper wire	Same as gas furnace
Type furnace	Kenworthy water seal	Same as gas furnace except without muffle
Oper. temperature	1100° F.	1100° F.
Fuel cons. per 100 lbs.	67 cu. ft.	5 kwh.
Unit fuel cost	50c per 1,000	1½c per kwh.
Cost per 100 lbs. product	3.35c	7.5c

In spite of the fact that more dead weight is heated in the gas furnace, the heating cost is less than half that of the electric unit, and the work is of equal quality. A new type of continuous gas-fired furnace will produce a better product at a considerably lower cost per unit than either of the furnaces mentioned here.

Japanning

Operation—Japanning of automobile parts.
Equipment—Semi-A type continuous ovens.
Operating temperature—450° to 500° F. average.

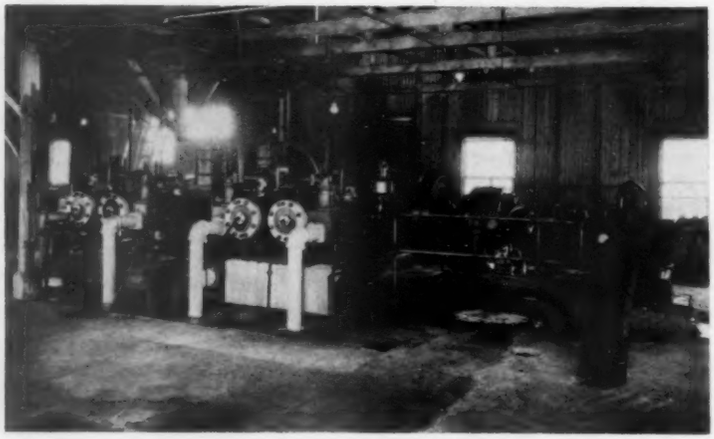
	Gas	*Oil*	*Electric*
Fuel per ton product	380 cu. ft.	12 gal.	120 kwh.
Unit fuel cost	60c per 1,000 cu. ft.	5c per gal. at burner	1½c per kwh.
Cost per ton product	$ .24	$. 60	$1.80

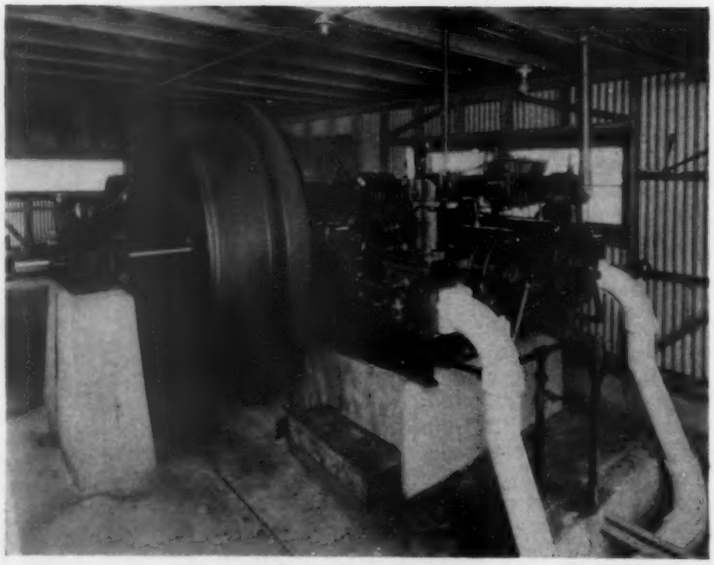
The product from the gas-heated oven is of the highest quality, is more uniformly baked, and is produced at a lower cost than with other forms of heat. In addition, the use of recirculating heaters on the gas oven assures safer operation than by any other method. No wonder that oil and electricity are rapidly being supplanted by gas in this important process.

The foregoing tests give a representative cross-section of industrial heating processes. Other processes might be mentioned, but a complete listing is impossible due to the rapid changes taking place continually in modern industry. What is new today is obsolete tomorrow. The men who know are modernizing with gas, the fuel of the present and the future.

The Natural Gas Engine in Southern California

Some pictorial examples of installations in a territory which contains more of such units than any other equal area in the world. The diversity of application is noteworthy.





Upper Right—A 320 HP. Twin Duplex Western Enterprise Natural Gas Engine, complete with auxiliary parts and directly connected to a centrifugal Booster Pump for pumping irrigation water.

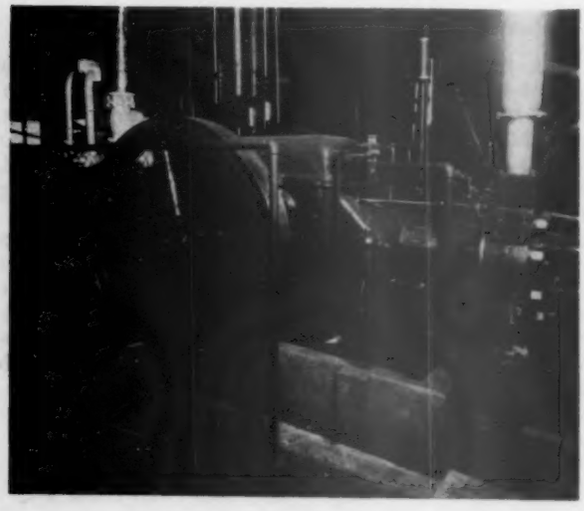
Above—A Cooper-Bessemer 60 HP. Natural Gas Engine directly connected to an automotive compressor manufacturing ice in an ice plant.

Right—A 160 HP. Western Enterprise Natural Gas Engine complete with auxiliary equipment driving a turbine deep well pump, pumping water for irrigation service.

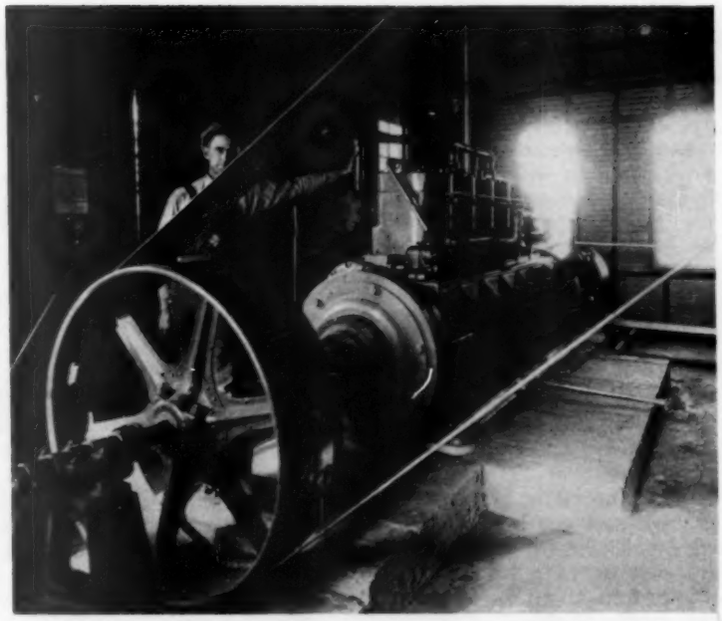
Below—A Cooper-Bessemer 170 HP. Twin Type 80 —4 Cycle Natural Gas Engine, directly connected to two stage air compressor supplying air at 125 pounds pressure for use in a foundry.

Lower Right—A 160 HP. Western Enterprise Natural Gas Engine driving an alternator for supplying electric current in a factory.

Photos courtesy Pacific Coast Gas Assn.



Cotton Ginners in Texas Save 85% in Operating Cost by Changing to Natural Gas



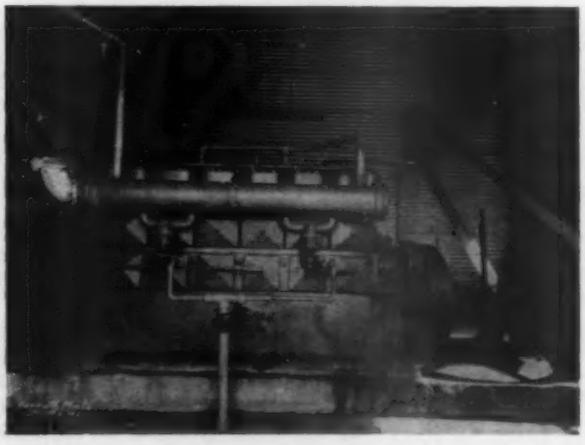
How one of the gas-powered engines, used with much savings by Texas ginners, looks fully installed. The belt connects with the gin.

AARON KLEINMAN

TEXAS cotton ginners are changing from expensive electric power to the comparatively cheap power generated by gas-driven engines with a resultant saving of at least 85 per cent in operating costs. Whereas the cost of ginning a bale of cotton by electricity varied from 75 cents to $1.35 with an average of about $1, cost by use of natural gas reduced to a range of 6 cents to 25 cents, with an average of 15 cents.

More than 2000 ginners assembled in annual convention in Dallas, Texas, during April, and soundly protested exorbitant power rates. When informed by the power companies that no immediate reduction was forthcoming, they began looking to other sources for power—and were immediately attracted by the natural gas power plants.

Many had already installed the new-type, light engines burning gas. Word of the economical operation and convenience of these plants, coupled with a low initial cost, spread rapidly among the delegates, who immediately began to investigate the several gas-driven engines operated as exhibits on the convention grounds.



Six-cylinder gas-powered engine installed in the Community Gin Co. at Italy, Texas. Taking the place of electrical equipment, it reduced the cost of ginning one bale of cotton from over $1 to 16 cents.

There are about 4000 gins in Texas, representing a $100,000,000 investment.

Figures compiled by the North Texas Gin Co., operators of 21 gins using the three principal types of power—electricity, distillate and natural gas—revealed the huge savings in the gas engines. This company had recently converted from electric power to gas engines in two of its principal gins.

A Bruce-McBeth heavy type engine was installed in a 5-70 Continental gin at Melissa. The saving in operating cost paid for the investment in three seasons. This plant, using electric power, ginned 1222 bales of cotton at a cost of $1.0802 per bale. Changing to natural gas power, 2767 bales were ginned at a cost of .1356 per bale. In making the change, an electric unloader was retained and operated with the gas engine, added .1084 to the cost per bale.

But even with this addition, the cost of unloading and ginning a bale of cotton by natural gas amounted to only .2440, or a saving of almost 74 cents per bale. For the short ginning season this saving amounted to $2,067.58—approximately one-third of the initial investment in changing from electricity to gas.

The total cost of this change is as follows:

Bruce-McBeth engine	$6050	(including freight)
Engine Room	250	
Clutches, couplings, belts	565	
Foundation and setting	375	
Total	$7240	

Electric equipment used previously to run this gin cost about $2,035. This included three motors, one of 100 h.p., one of 10 and one of 20 h.p.

A meter reading after this plant had ginned 2000

bales by gas engine showed 691,000 cu. ft. of natural gas had been used, or 345 cu. ft. per bale.

The Bruce-McBeth engine is a heavy-duty type, and is not the kind that ginners are now installing. They are interested in the lighter, high-speed type that costs about half as much as the heavier engine and that has practically no installation expense. For instance, the lighter type does not require the heavy, solid foundation that the North Texas Co. was forced to install at an expense of $375. But as is illustrated in the Melissa gin even this heavier engine proves a more economical investment than electric power

Even more sensational is the savings effected by this same North Texas Gin Co. in converting the Community Gin Co. at Italy, Texas, to gas power. Here a 5-80, all-steel plant, one of the best and most modern in the state, was equipped with an Automatic Machine Co. engine. The engine cost $5000, with only $500 for installation.

The Automatic ginned 2390 bales of cotton. The average cost per bale was .1662, including the unloading by electrical power. Lubricating oil added .0311 to the cost of each bale, making the total .1973. This amounts to about three cents more per bale than the heavy-type engine, but the initial cost and installation was much less. Savings effected by the change will pay for this engine in less than two seasons. Electric power used previously had run practically the same as for the Melissa gin, over $1 per bale.

The operating season for a cotton gin is short. For that reason, a ginner needs reliable, convenient plant. The gas-driven engine has been found ideally suited to the operating conditions surrounding a gin. The new type engine resembles greatly an extra large automobile engine, built for heavy duty service. It has electric starting from an automatically charged battery, making it possible to start the gin as quickly and conveniently as an automobile by merely turning on the switch and pushing the starter button. This is of advantage to the ginner when loads are scattered, enabling the engine to be shut down when there is no cotton to gin and to be started immediately.

The following table shows operating costs of three gins of the North Texas Co., one powered by electricity, one by gas and one by crude oil:

	No. Bales Ginned	Cost Per Bale	Lub. Oil
Electricity	2163	.8167	.0111
Crude Oil	2060	.0651	.0542
Natural Gas	2767	.1356	

"With the gas engine, there is no clogging of lines by dirty or inferior oil," Mr. Lemrick pointed out. "There is no waste or bad fuel, the gas engine using just as much of the natural gas as it needs. Then too the oil engines cost several times as much as the new gas engines, and require a greater installation expenditure.

"Oil fuel too, presents a great problem and expense to the ginner. It is purchased by tank car, which requires the construction of a side railroad tracking to the gin. Storage tanks for the oil must then be erected. The fuel is wasted by leakage, and usually the oil so corrodes the tanks that new storage tanks must be constructed every few years.

"The cheap initial cost and operating expense of the gas engine, along with its reliability and convenience, makes it the ideal power plant for the ginner, wherever, of course, natural gas is available."

Gas Utility Sales Improve in February

REVENUES of manufactured and natural gas utilities aggregated $62,602,024 in February 1932, as compared with $66,393,193 in February 1931, a decline of 5.7 per cent, according to reports from 418 companies serving 14,216,741 customers and representing over 90 per cent of the public utility distribution of manufactured and natural gas.

This represents the smallest decline in revenues reported since September 1931, and indicates a distinct improvement over the preceding month of January 1932, when revenues of the reporting gas utilities fell nearly 12 per cent below the corresponding month of 1931.

The manufactured gas companies reported revenues of $3,225,722 for February, a drop of 6.4 per cent from a year ago, while revenues of the natural gas concerns totaled $30,376,302, or approximately 5 per cent less than for February 1931.

Sales of manufactured gas reported for February totaled 30,801,212,000 cubic feet, a decline of 5.7 per cent, while natural gas sales for the month were 67,956,353,000 cubic feet, a drop of nearly 7 per cent.

Throughout the country generally, industrial gas sales, both for manufactured and natural gas utilities, continued at levels considerably below the preceding year, the decline in sales of manufactured gas for industrial purposes approximating 9 per cent for the country at large, while industrial sales of natural gas were down nearly 14 per cent from February, 1931.

Sales of manufactured gas for househeating purposes declined only 4 per cent for the month, which was in sharp contrast to the drop of nearly 14 per cent which characterized this class of business in January.

—*Paul Ryan.*

Cooperation Making Uncle Sam Gas User

(Continued from page 22)

assured of its opportunity as a result of this single and very inexpensive study.

THE Manufacturers Section of A.G.A., which has made this splendid service available to the industry, deserves the congratulation and the thanks of all. It now remains only for individual utilities and individual builders of gas-using equipment to do their share of the job in order to secure splendidly helpful results for the industry. Prompt notice to A.G.A. headquarters in New York of any government undertakings should be given. Prompt response to requests from Washington for information on rate schedules, on equipment prices or performance of appliances, should always be forthcoming.

The industry is going to find this investment in "promotion" one of the finest expenditures that it has ever made. One of the utilities benefited by the Veterans Hospital developments described above has said, "The contracts which we have closed with the Government through the aid of the Washington office are worth to us all the cost of that office for a year." Perhaps some of the other utility and equipment companies would like to have a similar opportunity in calculating their own profits. We think this is likely to be so.

House Governors and Their Effect on Unaccounted For Gas

A. W. JOHNSTON, JR.
The Harrisburg Gas Co., Harrisburg, Pa.

THIS study has been carried on since April, 1931, in a property comprising approximately 33,000 meters, of which 11,500 are supplied through House Governors. The High Pressure Distribution System consists of 140 miles of steel main, varying in size from 2" to 8", with an average pipe age of about fifteen years, and a normal amount of dust accumulation.

The system pressure is 38 pounds, except during off-peaks at night, when the pressure is reduced to 25 pounds. One district, embracing 5000 meters, is supplied through district governors at 20 pounds pressure. The average yearly consumption, per meter, is 34,800 cu. ft. of .42 specific gravity Coke Oven Gas, having a 530 B.t.u. content.

In June 1927, a general survey of the system was undertaken in an effort to reduce the amount of "Unaccounted For Gas," which was then, about 13% of the send-out. Included in the survey was a systematic house-to-house inspection of governors, started in September, 1927, and completed in June, 1928. The following conditions were found to exist:

67% of the governors inspected, were not in proper adjustment.

5% of the governors were blowing without the knowledge of either the Company or the customer.

14% of those inspected, were on the point of blowing.

17% showed a lock-up or no-flow pressure, from 7" to 9" water column, indicating a readiness to blow with any variation in pressure.

During the period, September, 1927, to December, 1928, "Unaccounted For Gas" decreased 1.6%. In December, five months following completion of the inspection, it began to increase, with the result, that the reduction brought about by the inspection, was offset within the following year. Due to the fact, that routine blowing continued consistently, at about 27% of the number of governors in service, the increase was not attributed to governor performance.

Influence of Governor Design

Prior to 1930, the number of blowing governors per year averaged 27%. In 1930, this increased to 38% and drew attention to the abnormal condition. A preliminary investigation showed that eight different make governors were in use in the property. Shop tests revealed that of the eight, five either possessed unfavorable operating characteristics, were badly worn from long use, or obsolete. All adjustments and minor repairs were, at the time, being made on the customers' premises, with the exception of the non-replaceable type valve governors, which were being removed and repaired in the Shop. This latter type included about 36% of the total number blowing.

These conditions, coupled with the fact that, "Unaccounted For Gas" had risen to 12.12%, under otherwise normal operations, made it appear plausible that the two were related, and that the increase in "Unaccounted For Gas" might be traced to the action of the governors. With this in mind, the procedure in governor handling was revised as follows:

The five obsolete types were to be condemned on sight and replaced by governors of modern design.

All governors found blowing, were to be removed and a tag affixed, bearing the address of removal. No adjustments or repairs were to be made on the customer's premises.

Outgoing governors were to be overhauled and tested in the shop, through a consumption range varying from a pilot light to 150 cu. ft. per hour, and adjusted for a delivery pressure of 4", at a consumption of 150 cu. ft. per hour. In no case, was the lock-up or no-flow pressure to exceed 6". Sealing pressure was to be 12".

Each governor so tested, was to be given a serial or company number, and an additional metal tag, showing the date and nature of the last repair.

Record of each incoming governor was to be maintained by the governor repairman. This record was to contain such information as, serial number, date repaired, make, type, nature of repair, delivery and lock-up pressures, the date last repaired and the address from which the governor was removed.

Orders covering blowing, were to be maintained in a separate file, so that periodic analyses could be made.

Racks were to be constructed for motor vehicles transporting governors, to insure proper handling.

BLOWING GOVERNORS—TWELVE MONTHS COMPARISON

	1930–1931	1931–1932	% change
April	202	237	+17.3
May	325	233	−28.3
June	327	234	−28.4
July	461	235	−49.0
August	679	249	−63.3
September	402	253	−37.1
October	460	263	−42.8
November	471	286	−39.3
December	395	227	−42.5
January	248	159	−35.9
February	192	186	− 3.1
March	242	157	−35.1
Total blowing	4,404	2,719	−38.3
Total in service	11,400	11,600	
Blowing rate (%)	38.6	23.4	

The foregoing table, summarizes the results after one

Read before Pennsylvania Gas Assn. Convention, Wernersville, Pa., April 26-28, 1932.

year's operation under the revised procedure. The number of blowing governors decreased 38.3%, despite the fact that only 2740, or, 23.6% of the total number of governors in service had been replaced by improved shop tested types.

Factors Necessitating Governor Service Work

Accompanying this decrease, a similar reduction in "Unaccounted For Gas," which in April, 1931, was 11.74%, compared with 8.04% in March, 1932, made it evident that some relation existed between the two. Unfortunately, additional factors, one a standardization of meter reading, the other, a reduction in system pressures from 38 pounds to 20 pounds through district governors in a section containing 5000 meters, are included in the reduction of 3.7%. It is felt, however, the decrease brought about through these changes, is a comparatively small per cent of the total saved. The similarity between the "Unaccounted For Gas" curve, and that of blowing governors during the two years, is shown on the supplementary graph. The saving brought about by the former, is estimated to be 65,000-MCF, and involves an amount of $19,500.00, to which must be added, $1500.00, the saving due to the reduced number of governors serviced. (See curves, pages 33 & 34)

The following analysis, groups the principal factors necessitating governor service work, and tabulates the blowing rate of each during three successive phases of operation; first the period April, 1930, to March, 1931, during which adjustment and repair were being made on the customers' premises; second, the period, April 1931 to March, 1932, covered by the revised handling program, partly completed; third, a forecast based on the known performance of the improved governors, now being placed into service.

ernors with those of more recent design, the blowing rate of the governors, excluding that attributed to adjustment on the premises, was reduced from 29.0% to 23.4%. Ultimately, this rate will become 16.8%, which is slightly in excess of the anticipated rate originally estimated at 10 to 12%, but the cause can be traced to the performance of one type governor, which did not warrant scrapping, even though its operation was not completely satisfactory without modification. This governor accounted for 50% of the returns, and has a blowing rate of 27%, compared with 10% and 13.7% for the two additional types is service.

Dust Movement—An Important Factor

The blowing caused by the movement and accumulation of dust from main systems on governor valve discs, is estimated at 5.7% of the blowing rate. This is equivalent to 660 blowing governors annually, the repair cost of which is $1325.00. If we assume a 10% blowing rate for the newer type governors, 5.7% of which is due to dust, it follows that the inherent blowing rate of the governor itself is 4.3%, and the length of service of that governor almost indefinite. Careful observation has shown that dust movement is an important factor, and is particularly noticeable in the change period from one season to another, varying with decrease or increase in load. This condition, becomes most exaggerated during the months of September, October and November, and to a lesser degree during April, May and June, in this property. Elimination of blowing, due to dust, whether accomplished by redesign of the valve, seat, through some method of filtration, or, partial hydration of the gas, would materially assist in lengthening the service life of governors.

	1930–1931			1931–1932			Forecast based on performance of 2,740 improved type governors		
	No. of governor orders	% of total orders	% of gov. in serv.	No. of governor orders	% of total orders	% of gov. in serv.	No. of governor orders	% of total orders	% of gov. in serv.
Premises adj. repeats	1,092	24.8	9.6						
Dust movement	350	14.8	5.7	660	24.3	5.7	660	33.9	5.7
Governor construction	2,468	56.0	21.6	1,862	68.5	16.0	1,137	58.4	9.8
Other than blowing	194	4.4	1.7	197	7.2	1.7	150	7.7	1.3
Total	4,404	....	....	2,719	....	....	1,947		
Blowing rate	.....	....	38.6	... .	....	23.4	.....	....	16.8
Governors in service		11,400			11,600			11,600	

In 1930, repeat orders were responsible for 24.8% of the total blows, and therefore, 9.6% of the 38.6% blowing rate. During 1931, this figure was reduced to 1%, but because of the fact that adjustments were no longer made on customers' premises, it is included with the other factors making up the total rate. It is evident, however, that the decreased 1092 blows can be attributed to shop adjustment and repair in lieu of repair on the customers' premises, and proves conclusively, that replacement is more satisfactory than adjustment on the premises, unless governor operation is thoroughly understood by service men and closely supervised. This fact appears somewhat contradictory to modern governor design which, in most cases, stresses the advantages of repair in position.

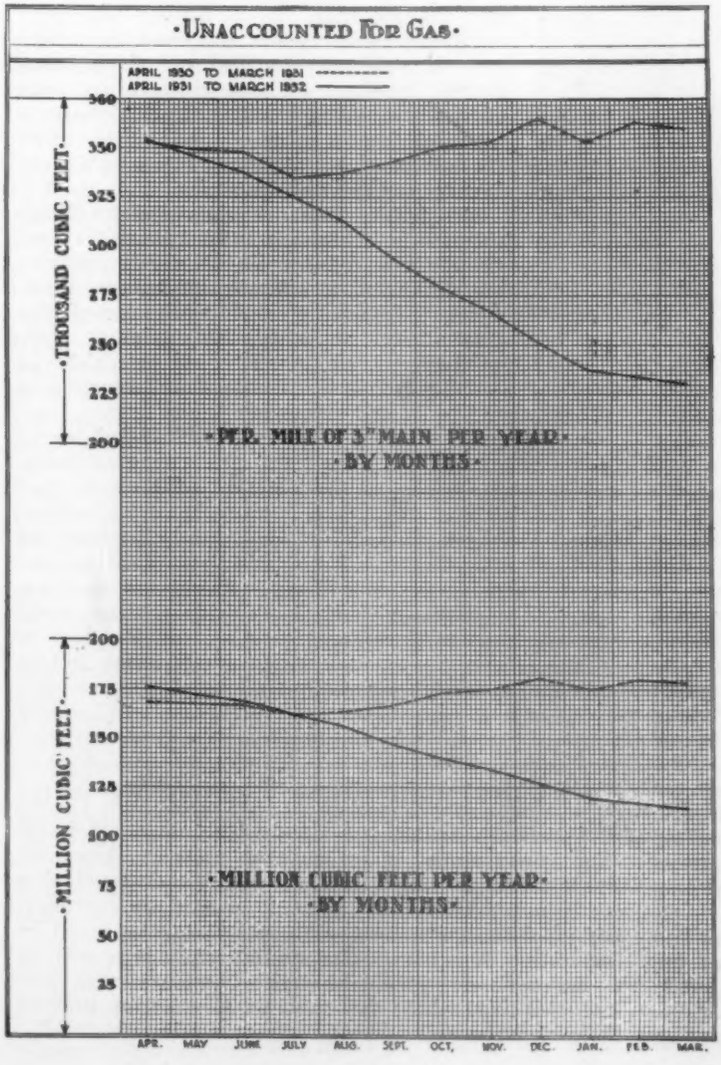
In replacing 2740 poorly operating and obsolete gov-

A continuous record of the number of tagged and tested governors placed in service and returning, monthly, is being maintained. To date, it is of little use, except in arriving at the rate of return and the fluctuation in return during different months. Eventually, however, it may become the basis for governor life forecasts or routine changes, if such is seen to be the better plan. A summary of the record is included in this paper. (See following page.)

Following a year's observation and test on different make governors in and out of service, it is found that blowing is, with few exceptions, confined to the action of the valve and valve seat, or, the inherent sensitivity of the governor. Of major importance, is the action of the valve and seat. While practically all of the modern make house governors, will, upon comparative bench

GOVERNOR RETURN RECORD—1931–1932

Month	Improved governors set	Number of improved governors returned by months												
		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total returned
April	377	8	5	6	4	2	9	10	8	8	10	4	5	79
May	250	...	3	6	4	7	9	7	8	10	3	2	3	62
June	281	...	...	3	5	5	7	10	7	7	6	1	2	53
July	262	...	...	...	2	6	19	10	12	3	2	4	3	61
August	227	...	...	...	.....	2	6	17	4	2	4	3	4	42
September	223	...	...	...	.....	.....	3	24	19	19	5	4	3	77
October	274	...	...	...	.....	.....	.....	4	12	10	3	2	5	36
November	286	...	...	...	.....	.....	.....	.....	3	5	2	6	4	20
December	160	...	...	...	.....	.....	.....	.....	.....	3	3	2	4	12
January	122	...	...	...	.....	.....	.....	.....	.....	.....	2	6	3	11
February	158	...	...	...	.....	.....	.....	.....	.....	.....	.....	1	6	7
March	120	...	...	...	.....	.....	.....	.....	.....	.....	.....	.....	2	2
Total returned	...	8	8	15	15	22	53	82	73	67	40	35	44	462
Cumulatives—total in service	...	377	627	908	1,170	1,397	1,620	1,894	2,180	2,340	2,462	2,620	2,740	
Return—by months—percent	...	2.1	1.3	1.7	1.3	1.6	3.3	4.3	3.3	2.9	1.6	1.3	1.6	
Return—per month—cuml	...	8	16	31	46	68	121	203	276	343	383	418	462	
Cumulatives—total in service	...	377	627	908	1,170	1,397	1,620	1,894	2,180	2,340	2,462	2,620	2,740	
Return—by months—percent—cuml	...	2.1	2.5	2.9	3.9	4.9	7.5	10.7	12.6	14.6	15.6	16.0	16.8	

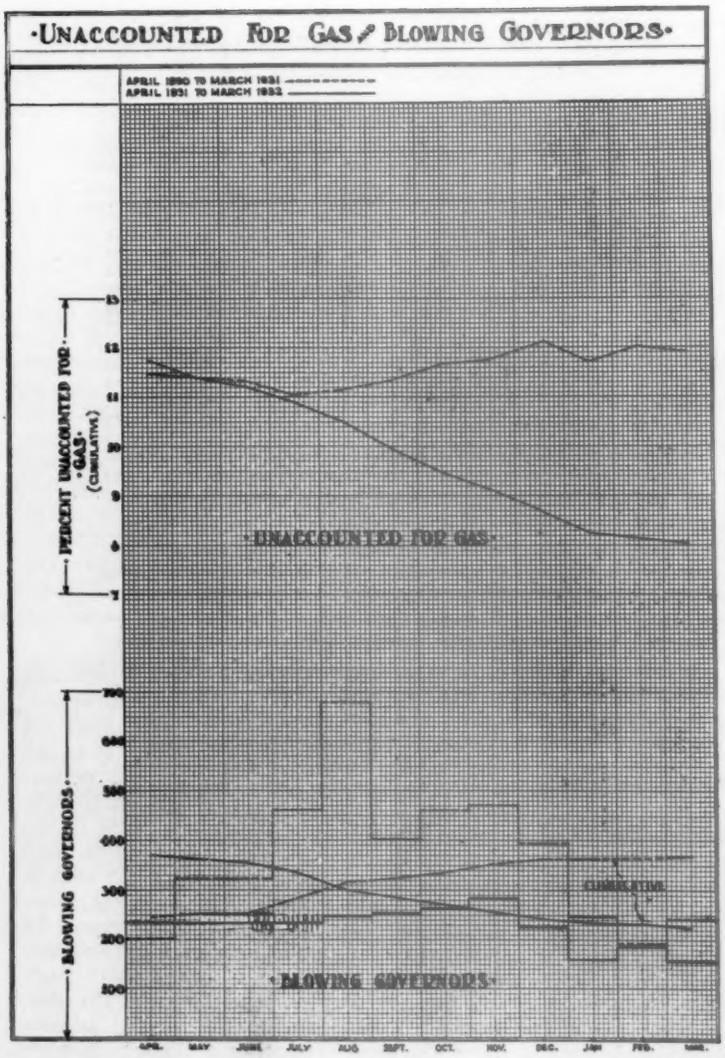

·UNACCOUNTED FOR GAS·
APRIL 1930 TO MARCH 1931
APRIL 1931 TO MARCH 1932
·THOUSAND CUBIC FEET·
·PER MILE OF 3" MAIN PER YEAR·
·BY MONTHS·
·MILLION CUBIC FEET·
·MILLION CUBIC FEET PER YEAR·
·BY MONTHS·
APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR.

tests, show about the same characteristics as far as delivery and lock-up pressures are concerned, little is known of their operation after extended periods in service. It is the intention of this paper to point out certain facts brought out by the investigation, to date.

In governors where there is little or no partitioning between the inlet chamber and the under side of the diaphragm, the area is such that a high pressure rush of gas is transmitted too rapidly to the diaphragm. In going from full load to no load, the momentary lock-up pressure is exceedingly high and the governor is sensitive. As the disc becomes worn from use, the initial adjustment changes, producing a higher delivery and lock-up pressure, which in turn, develops a momentary pressure sufficiently high to blow the seal. Even though a more positive action is obtained through a large partition area, it is of no special advantage, and develops a tendency to blow.

The most important cause of blowing is the valve disc, which is constructed of leather in practically all type governors in general use on medium pressures. The life of the disc defines the length of service of the governor, and the material being used at present, though accepted for years, can not be termed satisfactory.

The treatment of leather for disc use, consists usually in immersion in paraffin, beeswax, tallow or neutral oil, for the purpose of closing the pores. It has been found in service, that due to the constant bombardment of gas and dust particles, augmented by the force of the valve against the seat, paraffin or its substitute, is forced from that part of the disc in contact with the orifice mouth, toward the outer edge. At the same time, the gas acts as an absorbent. The result is a drying out of the center of the disc with a breaking down of the leather fibres and opening of the pores. This permits creeping, and be-


·UNACCOUNTED FOR GAS & BLOWING GOVERNORS·
APRIL 1930 TO MARCH 1931
APRIL 1931 TO MARCH 1932
·PERCENT UNACCOUNTED FOR GAS· (CUMULATIVE)
·UNACCOUNTED FOR GAS·
·BLOWING GOVERNORS·
·BLOWING GOVERNORS·
APR. MAY JUNE JULY AUG SEPT. OCT. NOV. DEC. JAN FEB. MAR.

comes very pronounced after about a year's use. Creeping may or may not, lead to outright blowing, but it does permit the loss of a small amount of gas each time sealing pressure is developed on the house piping.

When Creeping Starts

As near as can be determined, creeping begins immediately following the termination of the day's load. The pressure on the house side of the governor slowly builds up until sealing pressure is reached, at which time, sufficient gas is passed off to lower the pressure to nine or ten inches. Starting at ten inches, the pressure increases until blowing pressure is again developed. This condition takes place a number of times, depending upon the amount of seepage through the pores of the disc. It is thought, a minute amount of mercury is displaced each time the gas is permitted to escape. If the action is rapid enough, sufficient mercury is displaced to either blow the governor, or, upon resumption of the morning load, to bring about blowing through a normal lock-up pressure, operating against a reduced sealing medium.

In substantiation of creeping, due to open pores and broken down fibres, it is found that but 45% of the blowing takes place on governors supplying pilots, while 55% occurs on governors on which there is no pilot. The continuous flow pilot, therefore, takes sufficient of the excess or seepage gas, to extend the building up of pressure over a protracted period of time.

Blowing produced by dust may be of two types; the instantaneous blowing, due to heavy particles lodged in the disc groove during demand periods, followed by uneven seating after the load is discontinued, and, that produced when small moist particles of dust, build up a false, porous wall in the indentation made by the orifice against the disc. This latter type, permits creeping similar to that caused by broken down fibres.

It appears, therefore, that the problem resolves itself into satisfactory material for use as a valve, increases the "bite" of the seat, into the disc, and lessens the possibility of seepage, but at the same time, shortens the life of the disc. A rounded mouth orifice will, on the other hand, increase the life of the disc, but its wide groove presents a trough in which dust accumulates and produces blowing. It is necessary, therefore, to either sacrifice long disc life for positive shut-off, or, the reverse, for the two are dependent.

Disc Material Investigation

Effort is being made to obtain a satisfactory disc material. At the present time, four compositions are under test, and the return rate of governors containing each, is being closely followed. The tests have not been carried on for sufficient time to determine anything definite; however, it is believed that the materials under observation are all more satisfactory than leather.

While the loss of gas brought about through both blowing and seepage is appreciable, it is thought that a greater portion can be traced to the seepage, which determines the trend of the "Unaccounted For Gas" curve. This deduction is made from the fact that during a number of years in which the blowing rate remained fairly constant, the amount of "Unaccounted For Gas" was increasing.

In conclusion, it might be said, that while little or no improvement has been made on the governor itself, enough evidence has been obtained to establish the fact that loss of gas through governors is noticeably reflected in "Unaccounted For Gas," and therefore, of sufficient importance to insure handling more in conformity with meters, than bagged fittings. Consideration of the possibilities of future saving, stresses the necessity for more thorough research, in an effort to produce a governor of such design, that blowing and its contributing factors are minimized.

Obviating Pipe Corrosion

DR. H. E. Fritz, B. F. Goodrich Company chemical sales scientist, in a discussion before the American Society for Testing Materials recently declared that more than $200,000,000 annually wasted by corrosion and erosion on pipes and other metal could be saved by application of rubber. Cost of this waste is passed on to the consuming public, he said. There are more than 100 corrosives whose destructive action can be stopped by application of rubber.

Co-operation With The Dealer

W. JENNINGS YOUNG

Oklahoma Natural Gas Corporation, Tulsa

THE appliance merchandising situation in Oklahoma at present is one that really is not confined to the boundaries of the Commonwealth. The conduct and policies of the gas and electric companies operating in Oklahoma and Kansas are being watched by the entire nation. We are on trial, as well as the dealers who have the responsibility which we formerly shared.

As for our policy in the present situation, the Oklahoma Natural Gas Corporation has accepted the changed conditions in a spirit of whole-hearted co-operation. We disposed of our stocks of merchandise as speedily as possible, and cleared the decks for a program of working with the dealers to the end that they might do effectively the task that we had set out to do.

A Successful Plan

With the enactment of the Oklahoma Anti-Merchandising law we were fearful of losing the load building features afforded the utility company through the sale of efficient and modern gas burning equipment. Various programs were suggested and studied with the result that we adopted the following plan and after a period of seven months' operation we feel confident that it has been successful, considering general economic conditions.

A New Business supervisor was assigned to each district. His first duty was to sell himself to the various merchants of each city in the district to obtain their reasons for either opposing or approving of the gas company assisting in the promotion and developing of their sales, as the case might be. The second visit was made for the purpose of obtaining such information as was necessary in establishing a permanent record of the dealers' activities. We found, following the two above mentioned visits, that the various merchants had become convinced of our sincerity of purpose. All dealers were then invited to a dinner sponsored by our company. It was our desire to explain more in detail our proposed program and to present it before the entire group, in order that, through discussion and suggestions, improvements would be made by the dealers which would be mutually beneficial. As a result of the meeting held in connection with the dinner the following procedure was adopted and thus far has proven quite satisfactory to all concerned.

A week designated as "Gas Appliance Week" was agreed upon. The local office of the gas company mailed formal invitations to all customers appearing on their records, inviting them to attend our informal reception at the gas office and see the display of modern gas burning appliances offered by the local merchants. All newspapers were informed of the program and co-operated to the extent of dedicating a section of their paper to general news items concerning the use of natural gas, and the value of modern gas burning equipment as shown by the merchant on the display floor of the gas company office. The utility company and merchants ran advertisements in the papers announcing the show, using such forms as prove attractive.

At the opening practical favors were distributed by the gas company to those filling out cards which were attached to the invitations. Each individual, before receiving a favor, gave such information on the card that would indicate a complete inventory of the gas burning equipment in the home, together with the date of purchase and its present condition. The cards were then made available to the merchants as prospective purchasers. Appliance surveys were also made in practically all of the cities. The information obtained by the survey has been equitably distributed to the various merchants.

An Employee-Dealer Co-operative program was inaugurated September 15th for a period ending December 19th. Each employee of our company was instructed by literature and meetings the value of salesmanship in relation to the necessity of assisting the merchants in the sale of appliances. Bonuses were offered the employees for load acquired. This first venture resulted in the distribution of $948.10 in bonuses to our employees for the sale of 882 pieces of equipment. The appliances sold represented an additional annual load of 97,342 M cubic feet or a revenue of $34,155.38.

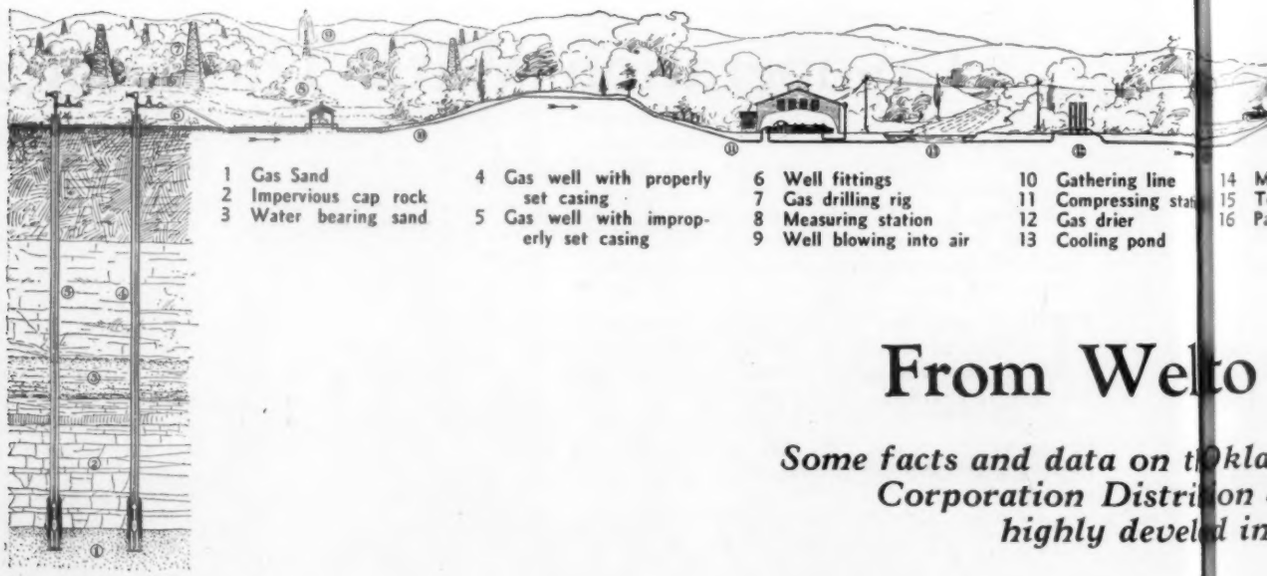
A Good Record

A second campaign, known as Revenue Contest, was started February 15th to be concluded March 7th. Results have been so satisfactory that the closing date has been extended to March 14th. The records as of March 7th indicated that more than $150,000 in additional annual revenue had been actually signed up by the employees. Figures, at this time, are not available to indicate the number of appliances represented by the figure quoted. With the additional revenue actually acquired we have also obtained excellent prospective business amounting to $280,000.

The gas utilities of Oklahoma had a comparatively brief experience in the merchandising field. This is particularly true with the company which I have the privilege to represent. Experience of operation under the existing law is likewise limited, consequently available records and data are not authentic or sufficiently complete to justify, in our opinion, a statement of the true value of comparison between the utility merchandising and the program made necessary by the recent legislative act. We must remember that our attempted co-operative plan is subject to the handicap of the depressed conditions of general business.

There are certain details involved in any co-operative program that are governed by local conditions; however, the basic fundamentals mentioned heretofore will provide an outline which we have found to be practical and profitable under existing conditions.

Discussion of the paper, "Appliance Merchandising in Oklahoma, 1932," read by William Parkerson before Oklahoma Utilities Assn., Tulsa, March 8-9, 1932.



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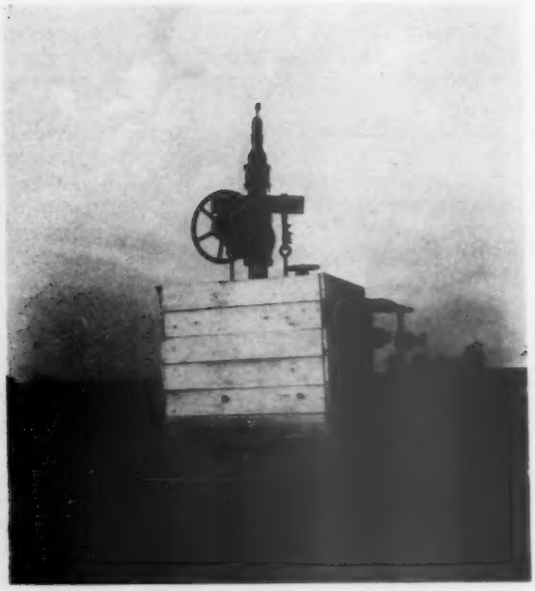


A gas well after the derrick has been removed. It is now ready for use.

The Kellyville Compressor station. One of the numerous such stations operated by the Oklahoma Natural Gas Corporation.

OKLAHOMA, third youngest state in the union, has rapidly grown to an important place in national industrial affairs. Typical of the state's growth are its industries and companies which have developed its vast natural resources and particularly is this true of the Oklahoma Natural Gas Corporation, its largest natural gas utility.

The Oklahoma Natural is four years older than the state. In 1903, a gas company served Tulsa, then a town of a few hundred. Gas came from one well over a pipeline seven miles in length. In 1932, this small company has, through various steps, become the Oklahoma Natural and it serves 75 communities from more than 1,000 wells in 45 different fields over a pipeline system of more than 3,000 miles.

Because the company is four years older than the state, and because the successful utility must keep ahead of the field, the Oklahoma Natural has kept just a bit in front of Oklahoma as the state advanced. Rapidly as the state grew, so did the company, because by keeping in front the company will always be available to render adequate service for any emergency at a second's notice.

That's one reason why the Oklahoma Natural Gas Corporation's system has often been called the most complete and dependable in the world.

Nine Districts in System

General offices are maintained in Tulsa, quartered in a beautiful ten story building, controlled by the company. Insofar as possible the company tries to localize authority. The system is divided into nine districts, eight in Oklahoma and one in Kansas. Each district has a manager and his authority is wide. Only in exceptional cases, where policy is involved, does the manager have to ask permission from the home office. And even in those cases the manager is allowed to perform the actual work which must be done in his locality.

In order that service will always be dependable, the company does not place trust in a single line or a single field. Its system is so interconnected that a community can get instantaneous service from any field, no matter how far away the field may be located. More than 1,000 wells in 45 different fields supply gas. The company owns 3,450 acres of land and has 159,720 acres under

14 Main transmission line
15 Telephone line
16 Patrolman on lookout for leaks
17 Measuring station
18 Pressure regulating station (for medium pressure)
19 Medium pressure line
20 Pressure regulating station (for low pressure)
21 Low pressure main
22 Service line
23 House meter

elto Burner

n tOklahoma Natural Gas trition System—the most veled in the world

lease. Land protected by gas purchase contracts is 209,144 acres and producing properties connected to the system total 60,000 acres.

The estimated daily open flow from the 1,372 wells is 2,272,638 M. C. F., with an estimated reserve of 187,662,824 M. C. F. Twenty-three compressor stations are in use with a horsepower of 13,540 and representing an investment of $2,234,266.00.

A Fine Record

The largest 24-hour sendout in the company's history was January 18, 1930, when sub-zero weather hit Oklahoma. The sendout for that day was 223,826 M. C. F., and newspapers all over the system were extravagant in their praise of the capable manner in which Oklahoma Natural met the emergency.

Nearly 120,000 consumers receive gas from the Oklahoma Natural in a territory in which population exceeds the 600,000 mark.

A total of 24,372,724 M. C. F., of gas was produced and purchased during 1931, with line losses amounting to 1,524,094 M. C. F., and 171,774 M. C. F., being used in compressor stations. Gas sales during 1931, totaled 22,676,856 M. C. F. The average B.t.u. content of Oklahoma Natural gas is 1070 with average specific gravity at .64.

The Oklahoma Natural transmission system requires 2,106 miles of pipe, from two to twenty inch sizes, or a three inch equivalent of 5,034 miles. The distribution lines, exclusive of service lines, requires 1,688 miles of pipe in the same assorted sizes with a three inch equivalent of 2,450 miles. The total length of transmission and distribution pipe is 3,794 miles, or longer than a trip from New York City to Los Angeles. The total three inch equivalent is 7,484 miles.

The domestic rate is only 45c per 1,000 cubic feet for the first 100,000 used in a month and 18c per 1,000 cubic feet for over that amount. Gas is sold to other utility systems and to industries at wholesale rates because of the large quantities used and the saving of the expense of retail distribution. Residential consumers spent an average of only 14¼c per day for gas in 1931.

The actual number of meters in service January 1, 1932, on the Oklahoma Natural system was 119,884 and

Shows scrubbers or cleaners through which all gas must pass in order to remove all foreign substances before being turned into the distribution mains.

A typical Oklahoma Natural Gas Corporation measuring station. This one is located at the city limits of Tulsa.

the services of 888 trained employees is necessary to render the quality service of which Oklahoma Natural is proud.

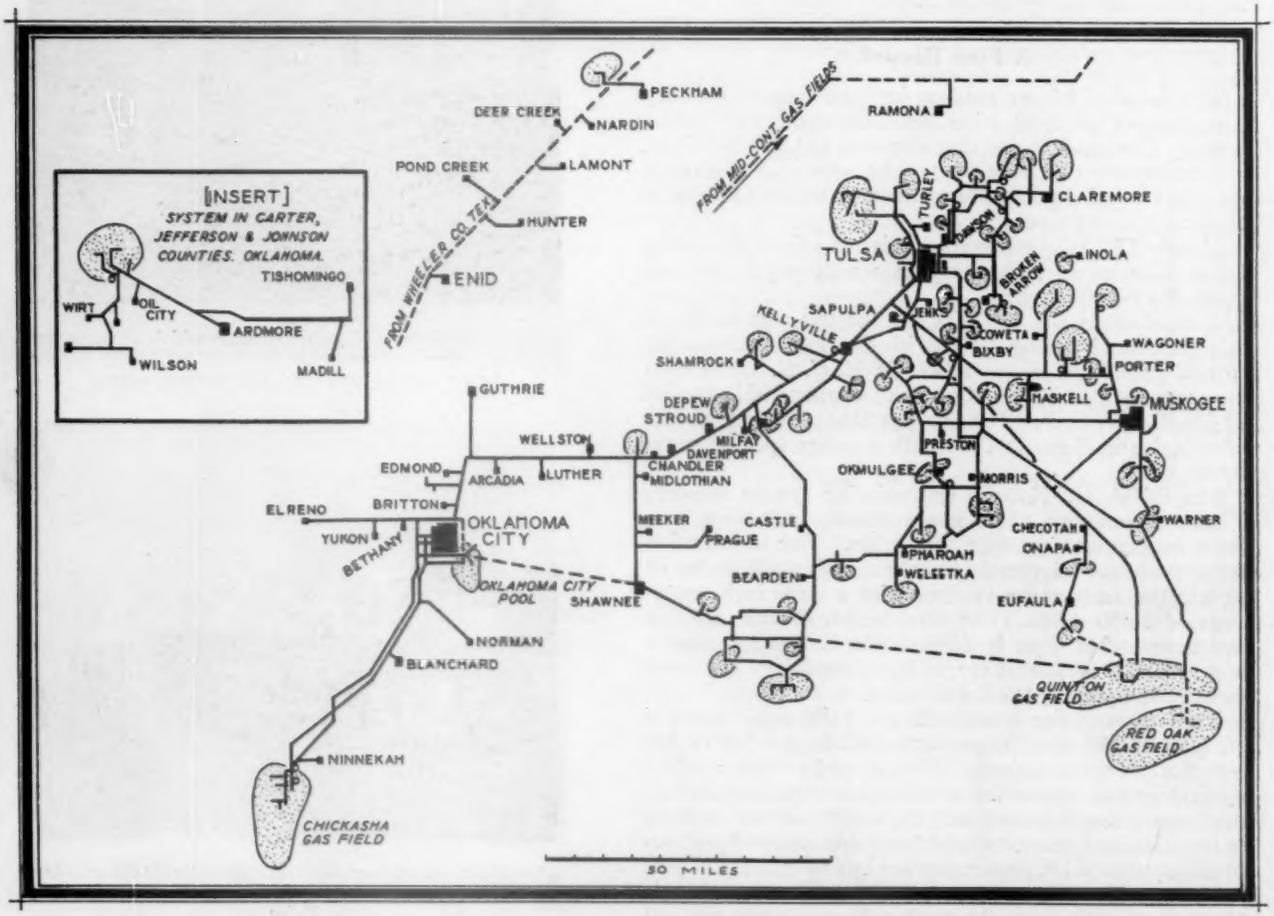
Aside from having a most complete natural gas system, the company has outstanding industrial accounts which place absolute confidence in Oklahoma Natural service. The Texaco Salt Products Company uses a load of more than a million cubic feet daily, while the Carbonic Products, Inc., a dry ice plant, is using a quarter-million cubic feet daily. Several refineries use Oklahoma Natural service and only two buildings of Tulsa's towering downtown skyscrapers group have failed to use gas for heating. There are other outstanding users too numerous to mention.

Oklahoma Natural Gas Corporation emergency car. This car carries fire fighting equipment, complete first aid kit, lung inhalator and other similar accessories. This company operates two other cars; one in Tulsa, and one in Oklahoma City, Oklahoma.

The company also has a far-reaching and very effective safety program. It is under the direct supervision of President E. A. Olsen, and from it the company has derived much benefit. The accident toll has been sliced in half and each district has a first aid team. The team from the Morris district won first honors in the state contests sponsored by the Oklahoma Utilities Association recently. In Tulsa there is a girls' team which has done efficient work.

Two emergency cars, equipped for fire fighting and rescue work, are operated by the company in Tulsa, and Oklahoma City. These cars have trained crews and are on the job 24-hours daily working in conjunction and under supervision of the city fire departments in those respective communities.

In Tulsa the company has adapted a compressor station grounds for picnic purposes, which is available to all civic and similar organizations. A swimming pool, a wading pool, swings, teeter-totters, long tables and benches and several gas-fired brick ovens are included among the conveniences for outings.

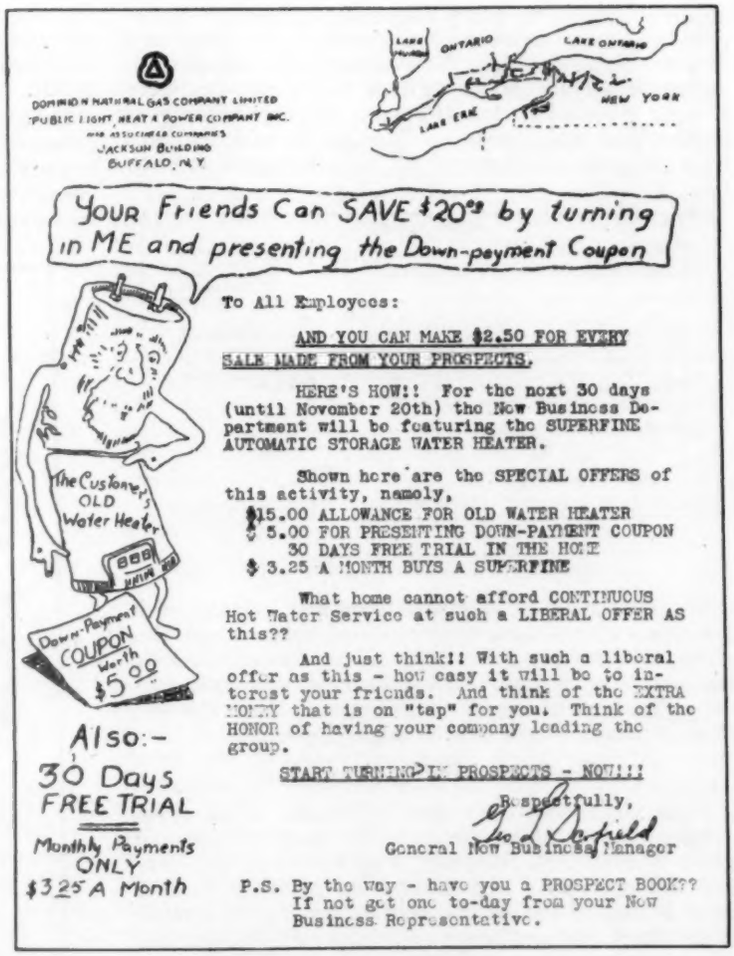


A map showing the Oklahoma Natural Gas Corporation's Oklahoma system.

A 100 Per cent Sales Organization Through Employee Cooperation

RALPH E. HARTZELL

Dominion-Republic Companies,
Buffalo, N. Y.


DOMINION NATURAL GAS COMPANY LIMITED
PUBLIC LIGHT, HEAT & POWER COMPANY INC.
AND ASSOCIATED COMPANIES
JACKSON BUILDING
BUFFALO, N.Y.
ONTARIO
LAKE ONTARIO
LAKE ERIE
NEW YORK
Your Friends Can SAVE $20.00 by turning in ME and presenting the Down-payment Coupon
The Customer's OLD Water Heater
Down-Payment COUPON Worth $5.00
Also:-
30 Days FREE TRIAL
Monthly Payments ONLY $3.25 A Month
To All Employees:
AND YOU CAN MAKE $2.50 FOR EVERY SALE MADE FROM YOUR PROSPECTS.
HERE'S HOW!! For the next 30 days (until November 20th) the New Business Department will be featuring the SUPERFINE AUTOMATIC STORAGE WATER HEATER.
Shown here are the SPECIAL OFFERS of this activity, namely,
$15.00 ALLOWANCE FOR OLD WATER HEATER
$ 5.00 FOR PRESENTING DOWN-PAYMENT COUPON
30 DAYS FREE TRIAL IN THE HOME
$ 3.25 A MONTH BUYS A SUPERFINE
What home cannot afford CONTINUOUS Hot Water Service at such a LIBERAL OFFER AS this??
And just think!! With such a liberal offer as this - how easy it will be to interest your friends. And think of the EXTRA MONEY that is on "tap" for you. Think of the HONOR of having your company leading the group.
START TURNING IN PROSPECTS - NOW!!!
Respectfully,
General New Business Manager
P.S. By the way - have you a PROSPECT BOOK?? If not get one to-day from your New Business Representative.

Letter Sent to Employees

FOR the past three years the efforts of the employees of the Dominion-Republic group have been solicited in the merchandising of gas appliances through a plan known as the Employees Bonus Plan. The scheme of this plan allows the Employee turning in the name of a prospect for an appliance to the Sales Department, a bonus for his efforts. The employees' prospects are developed from their social and business contacts and usually are customers on the company's lines. If, however, some friend or business acquaintance is not already a customer and if the employee is successful in interesting him to become a gas consumer, the employee is awarded a "new service bonus" as well as the regular bonus on any appliances which are purchased by this new customer. A similar bonus is paid in the case of reviving a "dead service."

Informative Booklet

To assist the employees in this important work, a small booklet designed so that it can be carried in a pocket, was prepared. This booklet contained twelve prospect cards besides the rules governing the plan and the schedule of monies to be paid on all appliances retailing at their various prices as well as the fixed bonus on the reviving of and installation of services. The employee checks the appliance in which the prospect is interested, fills in the prospect's name and address, and signs his or her name. These cards are printed in duplicate—the original is turned into the Sales Department and the duplicate copy is retained in the book as the employee's record.

When the prospect card is received by the Sales Department, the date of filing on the prospect is noted on the card. All prospect cards are good for a period of sixty days and if the employee desires to refile at the end of that time, it is necessary that he make another personal call upon this prospect. If the Sales Department is successful in closing this sale from the tip turned in by the employee, the employee receives his earned bonus on the first of the following month. If, however, the sale is not closed, the original prospect card is returned to the employee with proper explanation noted thereon.

To keep the employees informed as to the sales activities of the Sales Department in their respective Districts, the District Sales Managers outline the activities for the following month at the regular monthly social gathering. Also on the first of each month a letter is sent to each employee at his home address, giving him or her the special features of the sale along with prices and terms. They are also asked to watch the newspaper ads and other advertising such as broadsides, direct mail folders, etc., from which many sales points may be gathered.

The success of the early stages of employee co-operation was very evident. For instance, in July and August, 1931, during a 54 working day campaign on automatic storage water heaters, the employees were directly responsible for 101 sales through turning in prospects on this appliance. It might be said that here were 101 sales which would not have otherwise come to

PROSPECT CARD

Name ..... Date .....

Address ..... ☐ New Customer ☐ Old Customer

Town ..... ☐ Owner ☐ Renter

The above party is intersted in the Appliances checked below:—

☐ Gas Range	☐ Circulating Heater	☐ Conversion Burner	☐ Dead Service Revived
☐ Hot Plate	☐ Radiant Heater	☐ House Heating Boiler	☐ New Service
☐ Laundry Stove	☐ Refrigerator	☐ Gas Fired Radiator	
☐ Tank Heater	☐ Garage Heater	☐ Restaurant Equipment Specify:	☐ Industrial Equipment Specify:
☐ Storage System	☐ Kitchen Heater		
☐ Incinerator	☐ Hot Air Furnace		

What information led me to file on this customer:—

.....

.....

Approved Disapproved (over)

....

Mgr. Mgr. Name of Employee

Prospect Card—Obverse

light, at least not at this particular time. Many such gratifying results have been recorded by the employees during activities on other types of appliances. During the year August 1930 to August 1931, the employees through this plan were directly responsible for the sale of approximately $100,000.00 in gas appliances.

Plan More Highly Developed

Prior to October 1931, the importance of employee co-operation was taken into careful consideration and study by Mr. S. B. Severson, Vice-President and General Manager, and Mr. George L. Scofield, General Sales Manager, and on the first of that month a more highly developed and better organized plan was put into effect. Having seen the fine results of employee co-operation for the past year or two under the regular bonus plan, it was very evident that still greater benefits both to the company as well as the employee could be secured. Also due to the general recession in business which decreased the demand for gas appliances as well as the customary winter lull in operations, the Installation Departments were in need of more appliances to install so that here were two important factors to be

(To be filled in by Salesman)

Date Called Result of Interview

.....

.....

.....

.....

Remarks .....

.....

.....

.....

Prospect Card—Reverse

taken into consideration. Not only would increased appliance and gas sales result but additional selling would create work for men in our own organization, the manufacturers, the raw material producers, and so on 'round the cycle. While it is an impossibility for the employees of this group to bring about prosperity alone, it was felt that with approximately 400 employees taking the role of salesmen, it would have its good effects on the various communities as well as on the company, by stimulating the idea of buying into the minds of the public.

So, in answer to the many problems which faced this group of companies came the introduction of Mr. Severson's 100% Sales Co-operation Plan, which is today considered one of the most important steps ever taken by this group in their endeavor for increased appliance

SCHEDULE OF BONUS FOR GAS APPLIANCES

The amount of the regular bonus payable for leads or tips resulting in sales will be as specified below in the various price classes. The time selling price to the customer after the old equipment allowance is deducted will be the amount considered in determining the tip commission.

Example: A storage system selling for $99.00 less $20.00 old equipment allowance is sold to the customer at $79.00. The commission paid on this lead will be $2.50.

		Regular Bonus
Appliances	$ 5.00 to $10.00	$ .25
"	10.01 to 20.00	.50
"	20.01 to 30.00	.75
"	30.01 to 40.00	1.00
"	40.01 to 50.00	1.25
"	50.01 to 60.00	1.75
"	60.01 to 70.00	2.00
"	70.01 to 80.00	2.50
"	80.01 to 90.00	2.75
"	90.01 to 100.00	3.00
"	100.01 to 110.00	3.25
"	110.01 to 120.00	3.50
"	120.01 to 130.00	4.00
"	130.01 to 140.00	4.25
"	140.01 to 150.00	4.50
"	150.01 to 160.00	4.75
"	160.01 to 170.00	5.00
"	170.01 to 200.00	5.50
"	200.01 to 300.00	7.50
"	300.01 to 400.00	10.00

The maximum tip commission on any sale will be $10.00.

New Services secured	.75
Dead Service revived	.75

Schedule of Bonus for Gas Appliances

and gas sales, better opportunities for their employees, and to assist in the return to normal business conditions.

The 100% Sales Cooperation Plan

The theme of this plan is just what the name implies—the entire organization striving for increased appliance and gas sales in co-operation with the Sales Department and associated dealers. Heretofore the Sales Department has endeavored to cover approximately 74,000 customers in the 79 widely scattered communities of Western New York State and Ontario, Canada. It was found practically impossible for members of this department to regularly cover this large territory thoroughly. Owing to this fact it was felt that much business was being overlooked which could be secured if covered regularly at more frequent intervals and above all fully covered during special activities.

With approximately 400 employees located in these

communities it was deemed possible that a better coverage could be made and much additional business secured if the employees were better organized to furnish their sales assistance.

Beginning October 1st the eight local District Managers were given charge of all operations within their respective districts. They were made personally responsible for sales activities as well as their other regular responsibilities. Furthermore, each local Manager was given charge of employee co-operation within his district.

Under this plan the local Manager appointed team captains who in turn have several employees reporting to him on sales assistance. Each team captain was given a quota of merchandise which he and his team mates would be asked to assist in selling during a three months' period. The quota was set from a unit standpoint—a unit consisting of $50.00 in gas appliances. The number of units allotted each team depended upon the number of employees on the team and the amount of sales to be expected from their particular territory.

Quarterly and yearly prizes were offered to the individuals, captains and managers who accomplished the most satisfactory results from the standpoint of sales assistance. The regular Employee Bonus Plan tip commissions are to be in effect during the year with possibilities of extra commissions during activities when they participate directly in the selling.

Fine Results

The importance of employee co-operation in merchandise selling was definitely assured on December 31, when the results of the first three months' period were computed and it was found that $39,208.81 in gas appliances had been sold through this plan. Furthermore it was very gratifying to note that average sales through tips per employee amounted to $112.50 for this relatively short time. The total number of units secured was 784 which represented 2.25 units per employee. In some districts the number of units secured per employee ran as high as 3.47 which shows that the plan has worked out to secure satisfactory co-operation from this large number of employees in these widely scattered communities.

Of the 44 teams making up the organization it was very gratifying to note that all except two teams reported sales, a number of units running as high as 86 units per team. The average number of units per team for the entire group was 18.7 representing a sales volume of $935.00 which substantiates the success of this plan.

After reading about this new plan, the thought might have formed in the reader's mind that it requires much additional work on the part of the Accounting Department to keep records of all this additional sales assistance and that it necessitates the keeping of an elaborate system of reports. However, this is not the fact. The sales contract is utilized to keep the record of this information so that in all, it has actually simplified the work of the Accounting Department in this respect.

Additional Beneficial Features

Employee co-operation has another very important feature other than that of sales assistance. In our particular companies, and no doubt would apply universally, it has resulted in the employee becoming better acquainted with the proper utilization of gas which not only results in more sales but more satisfactory sales. Complaints are thereby substantially reduced as the employees will be more familiar not only with their own regular duties, but with the construction of appliances, their installation, as well as the functions of the other departments. Also they will be more familiar with customers' demands which will tend to bring about better employee-customer relations. All of these factors are of vital importance to public utilities and with the employees equipped with this knowledge, the company will be able to render a better and more satisfactory gas service.

Window Display Experiments

GAS equipment dealers will doubtless be interested in some window display experiments recently conducted. One experiment proved that perfection is of great value and so is contrast.

A merchant placed a 39 cent article in his window beside a set of the finest silver he could obtain, regardless of price. The silver set emphasized the quality of the product even though the product itself had nothing whatever to do with a silver set and did not resemble it in any way. Sales were increased to 33⅓ per cent above normal in spite of the higher price.

Then the merchant went back to the old method of mass display, at the same time reducing the price of the product to 29 cents instead of 39 cents. Sales instantly dropped back to normal. All of which conclusively proves that price is *not* as important as many merchants believe.

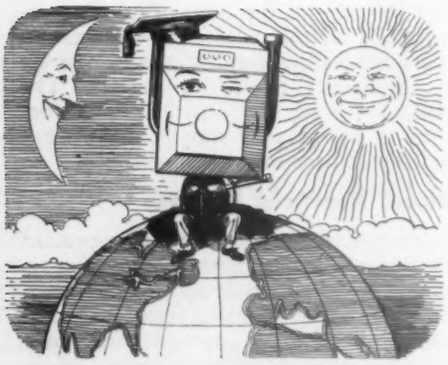
In another experiment display windows were draped and all merchandise was removed for three weeks. Sales on articles dropped off considerably—from 14 to 41 per cent, depending on the article. It was estimated that the net loss was $1000 per week.

It was determined in a third experiment that a right-hand window, under normal conditions, is worth about 20 per cent more than a left-hand window. In other words, products that are difficult to sell should be displayed in right-hand windows because such windows have 20 per cent greater attention value.

There is unquestionably a science that underlies profitable window display which is largely a matter of psychology. Simplicity, good taste, and an emphatic *point* in a display are of greater importance than all other factors combined.

—W. F. Schaphorst.

AMERICAN GAS MERCHANDISING ALMANACK



1932

June

'TIS said June sees a whale of a lot of new homes established, for it is the marrying month. New homes mean new home managers, new home appliances, modern gas ranges, automatic gas water heaters, press-ironers, clothes dryers and gas refrigerators. Grooms and in-laws spend well at the outset—remember this, you salesmen.

In approaching this new market do so with your head-up. forget the reduced price prattle, sell this new home manager dollar value, modern, well-built home appliances. Nobody wins in a sacrifice sale, and people who are spending today have long since sensed the fact that "cheap is cheap."

June will have a lot of mixed weather, starting off cloudy, but don't let that cramp your selling speed—the weather man also promises some mighty fine sunshine for selling refrigeration.

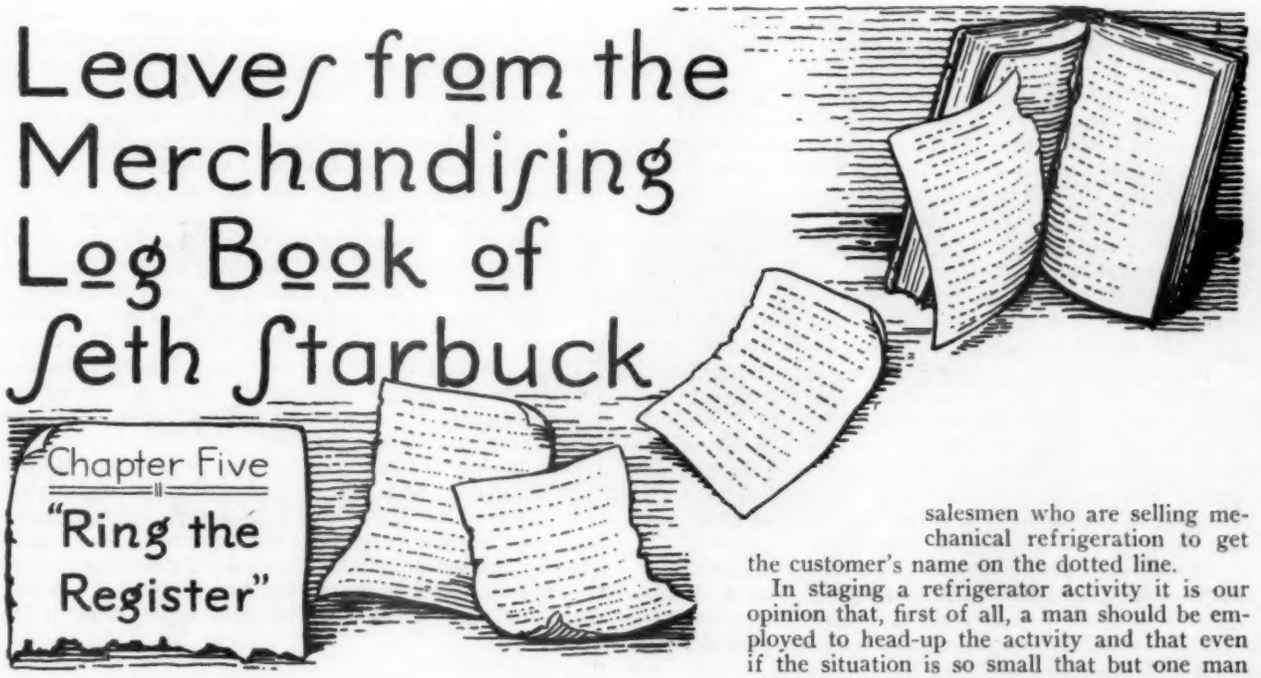
June brings the wild rose; June is the month of the pearl; June also brings the Sweet Girl Graduate, and in the midlands, the June rise. River boys along the Missouri, Mississippi, Kaw, Republican and Colorado can't do any good fishin' and may devote their time to refrigeration sales. June also brings "Father's Day"—whatta life!

June symbols are hearts, cupids and orange blossoms for the bride to be and the home manager of tomorrow; school colors for the graduate, neckties for the father—a good gas refrigerator would be more appropriate.

June windows may feature any of the appliances named. The backdrops and color scheme in general should be comprised of cool colors and the window cards should play-up VALUE.

1—Wed.	**Use that newspaper spread on refrigeration today.** Kentucky admitted to the Union 1792.
2—Thur.	Maine adopts the "noble experiment," 1857.
3—Fri.	Jefferson Davis born, 1808.
4—Sat.	**Line up to push refrigeration plan over; send advertisement to newspaper; get store and window displays lined up and install them tonight. Go over plans of activities to be carried on by Home Service Department. Get out executive's letter to employees giving reason for activity and special offer.**
5—Sun.	Augusta, Georgia, capitulated to Americans, 1781. Second Sunday after Trinity.
6—Mon.	**Check over all activities in detail; see that trucks and cars carry refrigeration advertisements.** Nathan Hale, patriot, born, 1755.
7—Tues.	Richard Henry Lee presented resolution to second Continental Congress—"these United Staets are, and of right ought to be, free and independent states"—1777.
8—Wed.	Andrew Jackson died, 1845.
9—Thur.	**Run newspaper advertisement playing-up down payment.**
10—Fri.	Continental Congress appointed committee to prepare Declaration of Independence, 1776.
11—Sat.	**Check over results of first week of activity. Send out mailing pieces to new prospects developed.**
12—Sun.	Careful Calvin Coolidge nominated for President of U. S., 1924. Third Sunday after Trinity.
13—Mon.	**Lucky Monday; have demonstration of ice-box desserts in store.**
14—Tues.	Flag Day. Continental Congress adopts Stars and Stripes, 1777.
15—Wed.	**Run newspaper advertisement; change store and window displays.**
16—Thur.	Kaiser Wilhelm erstwhile Emperor of Germany, crowned, 1888.
17—Fri.	John Wesley, preacher, born, 1703.
18—Sat.	**Have meeting with all people interested in refrigeration activity; go over leads supplied by employees; check quotas. Take advertisement to newspaper.**
19—Sun.	Elbert Hubbard, sage of East Aurora, born, 1859. Fourth Sunday after Trinity.
20—Mon.	**Use telephone to make appointments for salesmen.** DeSota, explorer, died, 1542.
21—Tues.	Summer begins—and come mosquitoes.
22—Wed.	**Run advertisement in home makers section of newspaper; announces Saturday demonstration.**
23—Thur.	Prince of Wales, born, 1894.
24—Fri.	**Run advertisement playing-up food saving and announce store demonstration Saturday.**
25—Sat.	**Check over results to date. Send out mailing pieces to new prospects.** **Check over Monday's newspaper advertising copy.**
26—Sun.	Lord Kelvin born, 1824.
27—Mon.	**Plan to close-up all prospects to whom special offer has been made; announce "Thursday last day" of feature used during activity**
28—Tues.	**Go over lists and use telephone to make appointments for salesmen.** Otis Skinner, actor, born, 1858.
29—Wed.	**Use telephone again today to arrange appointments for salesmen.** Senator W. E. Borah, born, 1865.
30—Thur.	**Last day of sale. Check results—it may be worth while to extend sale in which case be sure to give reason in the announcement of the extension.**

Leaves from the Merchandising Log Book of Seth Starbuck



Chapter Five
"Ring the Register"

NO doubt in many sections refrigerator sales have been planned and some may be in full swing by the time these notes from our Log Book find their way to the gas man's desk; however, as over 55% of the refrigerators sold in 1932 will be sold between May 20 and December 24, we are offering you some notes that may prove helpful.

As we view it the gas man has the edge on the refrigerator business. Today price has to be reckoned with, —price and guarantees are causing the manufacturer and the dealer in the electric field many restless nights. As this is written many dealers do not know just which way the cat is going to jump. Several manufacturers having recently reduced prices, others are expected to and the public pulse is jumpy. Sales of some well known makes are not being made easily or to the extent that was hoped for at the beginning of the year.

In the gas industry we have little to worry about. We have a tried and proven line of merchandise at a new low price, which we may back with an exceptionally fine guarantee; we have sizes to meet all demands and we have learned just about what folks wish in the way of color and design when they decide to purchase a refrigerator.

THESE things being true the only other thing that we have to look out for is to make sure that when we do get into the merchandising of silent refrigeration, we get off on the right foot.

Selling gas refrigeration is somewhat different from selling gas ranges, circulating gas water heaters, washers and ironers, and is, if anything, just a bit different from selling automatic hot water service. By that we mean that in our opinion the sale of gas refrigeration should not be turned over to the "regular" sales force to put over. The refrigerator is a high class specialty and demands specialty selling. Of all the appliances, refrigeration is subjected to more different kinds of competition than anything we sell. The salesman not only runs into fifty-seven other varieties of competition for the elusive customer dollar but he will encounter a number of new stunts in the hands of half a hundred salesmen who are selling mechanical refrigeration to get the customer's name on the dotted line.

In staging a refrigerator activity it is our opinion that, first of all, a man should be employed to head-up the activity and that even if the situation is so small that but one man seems at the outset to be too many, at least one man should devote all of his time to the work of promoting the sale of refrigeration. This man in turn should be supported by a factory trained service man.

THE next step should be taken by the chief executive. He should tell his organization that he is anxious to secure the desirable business that the sale of refrigeration will bring any company; that he believed in the gas refrigerator; that he wanted every one in the organization to know about its advantages and that he would back this up by a special offer to employees. This done the sales of refrigerators would start off in good style.

In laying out an activity the following promotional aids should be considered: 1—Newspaper advertising, 2—Display advertising, in store and windows, 3—Truck banners, 4—Tire covers, 5—Displays in the store of cooperative dealers and in their windows, and 6—Direct mail advertising. In short, no matter how badly your advertising budget is pinched, you should let it out an extra notch or two to put over this refrigeration activity. Base your expenditures on anticipated sales and charge what you can of it to new business advertising but put a wallop into the activity. It will be some time before you will have an opportunity to solidify the use of gas in the home to the extent you now have. Give this activity the works.

IN planning your newspaper advertising, aim to give the prospective purchaser the facts he wants to know in type faces that get immediate attention. Play up your advertising along the following lines: "Guaranteed for Your Life-time;" "The Only Refrigerator that has not a single moving part;" "No Belts, No Packing Boxes, No Compressors, a tiny gas flame furnishes you perfect, silent refrigeration"—you know the lines. And cut out that false modesty—you have an item that you can talk out loud about and know you are correct.

Put showmanship into this refrigerator selling and you will make a job of it; you will render your customers a fine service; you will get an off peak load that will

be mighty helpful; you will get a year 'round load that will make many an unprofitable meter at least pay for its keep.

If you wish to stage a drive it should be staged in June with another to follow from November 15 to Christmas Eve. These drives should enlist the support of all employees and should feature either a low down-payment or an extended monthly payment. Some companies favor a "trade-in" as the feature for a drive. We are of the opinion that the gas man does not have to trade as a rule, but where it is deemed advisable to meet competition a maximum trade-in allowance might be set and the salesman instructed to actually *trade* and not give the maximum to all-comers.

We are a strong advocate of employee co-operative activities and in this connection, we say pay any employee for prospects turned in that are sold in a given period. In making an offer of this kind to employees have the plan written out in such a manner that all points are clearly stated. Many of such plans have resulted in defeat for the simple reason that there was not a clear understanding at the outset.

During an activity a contest among departments or employees is sometimes very helpful. Races, hunts, etc., often prove popular. If you wish to stage a contest the manufacturer is always glad to provide you with a plan without cost.

IN building store displays put as much showmanship into them as is possible. Use raised platforms; build up your displays around columns that may center on the sales floor; build booths about the wall with attractive color lighting, use the cut-outs furnished by the manufacturer or model your own. Your window displays should also be modern. Use glass fronts for a refrigerator in operation, use realistic fruits and vegetables in floor models, play up the "Tiny Gas Flame," "Ice from Gas," "Silence" and "Modern design to fit into any color or period scheme of kitchen lay-out." Price all models. Play up low down-payments and extended terms.

In laying out outside activities for the salesmen, a list of house-heating customers will be found to be a profitable one to concentrate on. On the other hand, any good average home is a prospective purchaser of a gas refrigerator. Lists may be made up from the customers ledgers and while mechanical refrigerators will be found in many such homes, the salesman should undertake to learn from such users the names of friends who "are talking about buying refrigerators." Also, we feel that he should leave a leaflet of some sort with every person he calls upon. Remember, we want every one to know about the silent gas refrigerator and this is just another way to get folks to talking.

If your company has a home service department this department should plan to conduct demonstrations on the sales floor frequently and should follow up and instruct every purchaser of the many new recipes that may be prepared "now that she has a gas refrigerator."

Resolve right now to ring up refrigerator sales by planning your activity for the balance of the year. Rightly planned it will go over and you will lay the foundation for bigger sales next year, not only of refrigeration but gas cookery, gas for home laundry purposes, heating and incineration.

The gas bill of tomorrow must be more than a bill for cooking, it must be a bill for cooking, hot water service, refrigeration, laundry, home heating and garbage burning—then our per meter sales will be profitable and we'll have a much better satisfied customer for the simple reason that we are doing more for him, because his dollar spent for gas will show up in every department of his home.

THE Log says: "Play-up Life-time guarantee, Noiseless, No wear, No stuffing boxes to leak, No drop in efficiency, No recharging, Low operating cost." Estimates show that the percentage of sales of refrigerators is as follows:

January	2 % to 2.6%	July	10 % to 17 %
February	3 % to 4 %	August	8 % to 16.2%
March	3.8% to 9 %	September	6 % to 14.4%
April	5.5% to 17 %	October	6 % to 8.2%
May	9.6% to 16 %	November	3.5% to 4 %
June	13.5% to 14 %	December	2.7% to 4 %

The variation is due to difference in climatic conditions in some sections and due to activities staged by various companies. In building quotas figures of this kind prove handy.

The gas refrigerator will use 12 therms of gas per month and will give an 85% load factor. There are over 200,000 gas refrigerators in daily use today. The gas refrigerator is a 24 hour load and it is said to make the heretofore non-profitable apartment house meter a profitable one.

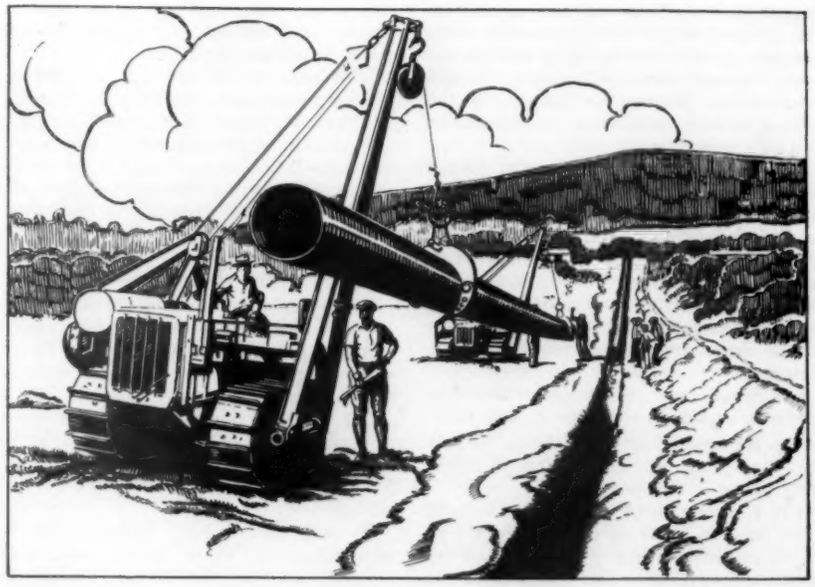
Starbuck's Rebus—Answer on page 56

Oil Competition—House Heating

THE sales of 88,000 motor-driven oil house heating burners in 1931 helped limit the scope of gas heating activitites to some extent but the entrance of several large oil companies into the promotion of these burners this year will present a much greater problem. The oil companies in striving for increased gasoline business in the past have not been particularly aggressive in the domestic heating field, but the struggle for existence this year has made new outlets imperative. Do not be surprised this summer if you read advertisements featuring $250 to $275 installed prices for the best oil burners that you formerly associated with $500 to $600 prices. Annual fuel bills at much lower figures than heretofore possible will go hand in hand with this drive. Electric motor manufacturers also are interested for it affords them an outlet for their equipment. Electric utilities receive $6.00 to $8.00 annually in revenue through the power necessary to drive these oil burners so encourage the movement.—

—Thomas Kennedy, before Penna. Gas Assn., 1932

Important Problems Discussed at Ninth Annual Distribution Conference



AS usual the Distribution Conference held in Birmingham April 6th to 8th, measured up to a high standard of excellence and was productive of much valuable information to those in attendance, both by way of papers read and the attendant discussions. Some 250 distribution engineers and manufacturers' representatives were in attendance, coming from many sections of the country.

A special train was run from New York to the convention and return and the two days of travel afforded the 60 men who journeyed this way ample opportunity to discuss their various problems. One of the outstanding features of the meeting occurred on the second day of the convention when the cast iron pipe manufacturers of the Birmingham district conveyed the delegates by way of autos to their plants where the entire process of pipe manufacture was shown from the start to the finish. While at these plants numerous pressure and bending tests were demonstrated. At noon on the day of inspection a fine barbecue lunch was served at one of Birmingham's nearby parks.

It is noteworthy to point out that at 8 P.M. on this day a session was held lasting well towards 11 o'clock, at which meeting the greater percentage of men were in attendance.

During the open forums held at the end of each session much interesting discussion was indulged in and many valuable facts were brought out; these had to do with such matters as meters speeding up and registering fast when changing over to natural gas as brought out by Messrs. Dunkley and Hough; sticking of plug valves discussed by Miner of Knoxville and Jones of Philadelphia; the use of tetralin for dissolving sediment from the inside of pipes brought up by von Maur of Toronto; the use of calodorant discussed by Hough; the development of a new cast iron bolt for joints and a discussion of the yield point of cast iron and steel bolts by Moore of American Cast Iron Pipe Company. In addition, the effect of governors on leakage and unaccounted for gas received considerably more than passing attention.

The successful conduction of the meeting was due to the interesting and efficient manner in which Chairman Lydecker presided.

Below are given some excerpts from a number of papers.

Sealing Fluid and Test Medium for Meter Provers

J. E. OVERBECK

Columbia Engineering and Management Corp.

A SURVEY has been made of some of the large gas companies in order to ascertain what sealing fluid and testing medium are most universally used. This survey indicated that the various companies use different methods as follows: Sealing fluids consisting of complete oil seal, complete water seal and in many cases an oil on top of water, the oil seal varying from 4" to 12" thick; testing mediums consisting of air direct from the room, air from compressed air or blower systems with varying pressures from 3" of water to 40 pounds. In some few cases gas from the city lines is used while in most cases air is used. The test medium in some instances is saturated with water vapor and in others with drip oil or drip condensates.

Due to these variations in practice which in most part are due to differences in local conditions, the Subcommittee cannot recommend absolute standard practices which will be applicable to all gas companies and will suit all local conditions. Many of the committee members have made tests in order that correct procedure might be ascertained with regard to sealing fluid and test medium. In some cases these experiments have resulted in the discovery of some very interesting points which have caused the experimenters to recommend changes in their companies' practices.

Although, as above stated, the Subcommittee is not in position to make recommendations of absolute standard practices, it is prepared to recommend certain fundamentals which the various gas companies may use to an advantage in establishing their own standard practices. These may be stated as follows:—

In proving displacement type meters on the type of meter provers usually used in meter shops (displacement or bell type) the following items should be considered and thoroughly understood:

The meter prover of the displacement or bell type is so designed and constructed as to contain a given volume sealed in the prover bell, as shown on prover scale, and only under the existing conditions of pressure, temperature and saturation at time of adjusting the pointer on the scale.

The displacement type of gas meter is also constructed so as to measure the volume passing through it under existing conditions of pressure, temperature and saturation at point of measurement.

Since the meter prover and the meter being tested both measure their volumes under existing conditions, the one most

important item of meter proving is that the volume of the testing medium from the time it is sealed in the prover to the time it passes through the meter should not change. Volumetric change of the testing medium may occur as a result of the following:

1. Change of pressure in the prover during the test.
2. Loss of pressure between the prover and the meter.
3. Difference between the temperature of the test medium entering the prover and the temperature of the prover.
4. Difference between the temperature of the meter and the temperature of the prover.
5. Change of volume of the test medium sealed in the prover due to:
   (a) Expansion of test volume by absorption of vapors from sealing fluid in the prover.
   (b) Contraction of test medium volume due to lowering of temperature of medium in the prover caused by evaporation of the liquid from the bell of the prover and from the sealing fluid.
   (c) Contraction of test medium volume caused by condensation from the medium.
   (d) Change in volume caused by change in temperature due to the latent heat of condensation.
6. Change of volume of the test medium as it passes through the meter is due to:
   (a) Expansion of test medium volume caused by absorption of vapor from the condensates in the meter.
   (b) Contraction of test volume due to lowering of temperature of the medium in the meter caused by evaporation of condensates.
   (c) Contraction of test medium volume caused by condensation deposited from the medium.
   (d) Change in volume caused by change in temperature due to the latent heat condensation.
7. Change in meter proof from that existing while in service due to change of friction on meter valve surfaces and flexibility of diaphragms, due to evaporation of condensates or deposition of condensates from the test medium.

Cause of Foregoing

The foregoing effects may be due to:

1. Improper counter-balance on prover and friction in guides and rollers.
2. Small dry well and connections between prover and meter.
3. Change in temperature of room air during night and day, and (where air is not taken directly from room) insufficient volume and length of lines from reducing valve of compressor, blower or gas lines to prover; also where wide variations exist between the temperature of room air at the bottom and top of prover as a result of concrete floor and un-insulated ceiling.
4. Temperatures of prover and meters are affected by change of temperature from night to day, also by not allowing sufficient time to elapse between receipt of meters in the room and time of proving, as well as bad prover locations in the meter shop, such as provers being placed too closely to heaters, outside walls, windows, etc.
5. When dry air or gas at constant pressure comes in contact with water or any volatile liquid, some of the liquid will evaporate forming vapor which will increase the volume of gas or air within the prover. Such increase in volume will depend upon the temperature and absolute pressure.

Water Vapor Action

At ordinary atmospheric pressure, dry air in contact with water may absorb water vapor up to 1.78 per cent of its volume at 60 degrees F.; at 70 degrees F., the maximum percentage of water vapor in the volume due to evaporation of water may be 2.52 per cent; at 80 degrees F., 3.53 per cent; at 90 degrees F., 4.86 per cent; at 100 degrees F., 6.60 per cent.

At each of the above temperatures the percentage of water vapor mentioned would cause the air to be completely saturated; that is, at 100 degrees F., air saturated with water vapor contains 6.60 per cent water vapor, and at 80 degrees F., air saturated with water vapor contains 3.53 per cent water vapor. Therefore, if air saturated with water vapor at 100 degrees F. is cooled to 80 degrees F., its volume will be reduced approximately 3.07 per cent. At 70 degrees F., air saturated with water vapor contains 2.52 per cent of water vapor which is 100 per cent saturation. Therefore, atmospheric air which has a humidity of 50 per cent, or is saturated with 80 per cent of water vapor, contains 1.26 per cent of water vapor by volume.

If atmospheric air having a humidity of 50 per cent at 70 degrees is drawn into the prover and allowed to remain in contact with water in the prover, some of the water will evaporate until the air is 100 per cent saturated and the increase in volume (when the air is 100% saturated) becomes approximately 1.26 per cent.

The effect of these changes will become more pronounced with circulation, higher temperatures and low humidity of air entering the prover.

Air from compressed air lines is more nearly dry, so that the amount of water vapor which will be absorbed by the air is greater than that absorbed by atmospheric air.

The following table gives the maximum percentage of water vapor in gas or air saturated with water vapor at various temperatures and at an atmospheric pressure of 14.4 pounds:—

Temperature Degrees F.	Per Cent of Total Volume Which is Water Vapor When 100% Saturated
40	0.85
50	1.24
60	1.78
70	2.52
80	3.53
90	4.86
100	6.60
110	8.87

The evaporation of the liquids from the prover bell and sealing fluid requires additional heat, and heat is absorbed from the surrounding air or objects, hence the temperatures of the test medium sealed in the prover are reduced. This may cause a contraction of the volume in the prover of approximately 1 per cent for each 5 degrees F. that the temperature is lowered. This does not take place instantaneously but during a period of time. However, the effect is sufficiently rapid to make material change of volume in provers at ordinary temperatures during the time required to make a check test of a meter.

Although it is possible to determine the approximate increase in volume due to the absorption of vapors, the off-setting effect caused by temperature changes due to the evaporation of the liquid from outside of the bell cannot be determined with any degree of certainty for the reason that this effect will depend upon the specific heat of the metals, the velocity of the air around the bell, temperature of the liquids, temperature of the air, humidity of the air and atmospheric pressure.

6. The change (as mentioned under Item No. 5) which takes place between gas or air and water also takes place between any liquid and gas or air. Although its effect is generally not noticeable for oils of low volatility; that is oils having what is commonly known as low vapor pressure, the benzols and other condensates which form in manufactured gas meters usually have much higher vapor pressure than water and consequently will evaporate more readily than water. Consequently, the increase in volume of dry air or gas under constant pressure when in contact with these liquids is relatively greater.

The increase in volume due to all of the constituents will depend upon the sum of the effects due to each constituent; that is, air saturated with water vapor will increase in volume when in contact with benzol. The percentage of increase will depend upon the vapor pressure of the benzol and the temperature. The increase in volume in this instance would be the same as if the air were dry and came in contact with the liquid benzol.

7. The evaporation of benzols and other condensates from the deposits on valves and from diaphragms will cause them to become dryer, and therefore may cause a change in meter valve friction and in the flexibility of diaphragms.

Possible Remedies

Changes due to (1) are eliminated by properly constructed and maintained meter prover.

Changes due to (2) are practically eliminated by the use of dry well and a hose of sufficient size between prover and meter.

Causes (3) and (4) can generally be eliminated by maintaining the temperature of the medium entering the prover, the prover and the meter, the same. The temperature of the medium, the prover and the meter, may be influenced by the

improper location of meter prover in the meter shop and improper insulation from floor and roof or ceiling. The ideal method is to keep the temperature of the air in the room properly controlled so that there is a minimum change in temperature during the 24 hour period. In many cases portable recording thermometers will be of great assistance in ascertaining whether or not proper temperature conditions are being maintained and if they are being affected by drafts, etc. The meters should be placed in the room a sufficient length of time before proving so that the temperature of the meter is the same as the temperature of the air in the room. If compressed air or compressed gas is used as a medium, the piping between the reducing valve and the prover should be of sufficient length and sufficient volume to allow the temperature of the medium to become the same as the temperature of the room during the filling of the prover.

Causes (5), (6) and (7) seem to be the items which create the most complication. It is believed that whatever method is used to correct (6) will automatically take care of (7). Therefore, we shall eliminate (7) from this discussion.

Proving New Meters

In proving new meters rediaphragmed meters or meters previously measuring gas which was never saturated to the extent that condensate existed in the meters, items (6) and (7) can be ignored and (5) can be eliminated by the use of air as a testing medium and complete oil seal as a sealing fluid. The oil should be of low volatility and low viscosity.

Most of the disadvantages of the use of oil have been pointed out by parties who have not used oil but have formed their conclusions by inferences. The disadvantages which are usually mentioned are: (1) Difficulty to adjust temperature of the oil; (2) fire hazard; and (3) cleanliness. It would seem that the difficulties due to adjustment of the temperature of the oil are purely secondary for the reason that if the proving room is maintained at nearly constant temperature during the 24 hour period, the temperature of the oil will vary from the temperature of the room but very little. If it is necessary to change the temperature of the oil due to the fact that it cools during the night, the meters will be cooled at the same time and there is no practical means of adjusting the temperature of the meter.

It is realized, however, that on account of the small amount of metal in tin meters, the temperature of the meter will approach the temperature of the room more rapidly than a larger volume of oil, and it is quite possible that the transfer of heat to or from iron meters will be more rapid than the transfer of heat to or from the oil. In any case, it is seldom necessary to decrease the temperature of the sealing liquid; it is usually necessary to add heat and this can be done readily by the use of hot water coils or electric heaters.

The temperature of the oil will approach the room temperature more rapidly than the temperature of water for the reason that the specific heat of oil is considerably less than water. Volume for volume, the specific heat of oil is about 40 per cent of that of water, so that in order to raise its temperature to room temperature less heat will be required.

No difficulties have been experienced on account of lack of cleanliness if the provers are completely filled with oil. In cases when a few inches of oil on top of water in provers are present, the emulsion with dust produces a scum on the outside of the bell which becomes unsightly.

A Different Problem

A different problem exists in proving meters which have been measuring gas which is saturated to the extent that condensates drop into the meter. In case the condensates contain water, the use of nearly saturated testing mediums would be a benefit. However, in case the condensates contain other liquids deposited from the gas, it is evident that the least difficulty may be produced by the use of gas, same as measured while in service, as a testing medium. Many of the large gas companies have performed research study due to the fact that their meters come under this class.

One of the large gas companies has made considerable research study, using a complete water seal as a sealing fluid with no oil on the top, and a test medium of air taken direct from the room. This company has discovered some very interesting and valuable data. This study is not yet completed, therefore, we shall not attempt to give any conclusions in this progress report. The expansion of the volume in the prover bell due to picking up of water vapor may be compensated by the contraction of the volume in the prover bell due to evaporation of the particles of water on the prover bell. By the use of this practice, it may be possible that the expansion of volume sealed in the prover (due to absorption of water vapors) may be compensated by the contraction of this same volume due to evaporation of particles of water clinging to the prover bell. An item which must be considered, however, is that if evaporation (contraction of volume) is necessary to compensate for the absorption of water vapors (expansion of volume), the next important item to consider is the lowering of the temperature of the test medium sealed in the prover below the temperature of the meters being tested. This practice will tend to saturate the testing medium with water vapor and hence may correct for some of the causes for errors as mentioned under (6) and (7). It may be well to mention, however, that if saturation of proving medium is accomplished in some other manner, the surface of the bell should then be such as to retard evaporation (contraction of volume sealed in the prover) since humidification or absorption of water vapors (expansion of volume sealed in the prover) will have been eliminated.

Another of the large companies uses gas saturated with water and gas condensation vapors as a testing medium. The sealing fluid which is used is water with a 6" seal on top consisting of Ciro x light oil mixed with gas condensation of proper percentage to suit the existing local conditions. With this practice in use, causes for errors due to items (5), (6) and (7) may be eliminated.

As stated previously, many other practices are in use and information can be furnished concerning these upon request.

Since, as already set forth, this Subcommittee cannot at this time recommend a practice or method which will suit all conditions, we shall, however, state certain requisites which will suit all conditions; its members shall, however, state certain requisites which we believe will help those interested in determining the best plan to follow:

(a) All meter prover bells when raised from the bottom to the top and pointer set at zero, should remain at zero position for a period of time equal to the time it takes to make a test on a meter; also that temperature of the test medium sealed in the meter prover is the same as the temperature of the meters being tested. From this test it will mean that changes of volume contained in the prover due to changes previously mentioned (Item 5) have been eliminated for all practical purposes or that they are compensating.

(b) After assurance is made under (a) that no change in volume or change in temperature exists in the volume sealed in the prover due to causes previously mentioned (Item 5) consecutive proof tests should be possible on the particular meters being tested. From this test it will mean that no changes are taking place in the meter due to items mentioned under (6) and (7).

Calibrating or Bottling of Meter Provers

Those members of the Subcommittee who were present at our second meeting held in Cleveland, Ohio, recommend the following for bottling or recalibrating:

Oil of low volatility and low viscosity should be used in both the cu. ft.

bottle and the meter prover, except that water may be used in both bottle and prover where 100% saturation of room air can be obtained, which requires special conditions usually not available in meter shops.

Distribution Sub-Committee on Pipe Coatings and Corrosion

J. K. CROWELL
S. R. Dresser Manufacturing Co.

IT was realized that in order to reach any solution of the problem, it would be necessary to carry on considerable research. It was decided that it would be best to work in cooperation with the Bureau of Standards, and a research associate at the Bureau was authorized late in the year to start work on the following tentative program:

1. Develop, evaluate and standardize methods of testing coatings by means of accelerated tests.
2. Check laboratory tests with field experience by means of coated samples buried in representative soil classes.
3. Make inspections of coatings already applied to pipe lines, to determine systematically what protection is being given and what life might be expected from the materials.
4. Supervise the application of short sections of coating materials to gas company lines under construction where it will be possible to make future examinations.
5. Gather data on the practicability of, and the cost of application of coatings which have been evaluated by test and experience, so that distribution engineers can select the coating which will best apply to their systems and which will make the best return on their investments.

From a consideration of all the data on the subject which is at this time available, it is apparent that we are justified in making the following statements.

1. That the only practical means of reaching a satisfactory solution of the problem of the protection of underground piping from corrosion is painstaking and necessarily slow research by those who are in a position to give their entire time to the work.
2. That the protective value of a coating depends primarily upon the nature of the coating and to a minor extent, upon the soil.
3. That when a coating fails, the pitting rate depends upon the soil.
4. That the electrical conductance and pinhole tests are useful methods for determining the protective value of coatings.
5. That the protective value of a coating is increased by increasing the thickness, within certain limits.
6. That mechanical distortion after application is the principal cause of bituminous coating failures.
7. That organic reinforcing materials are decomposed by bacteria and fungi in the soil and that the extent of this decomposition or rotting, depends upon the nature of the soil and upon the extent to which the materials are protected with bitumens or disinfectants.
8. That thin, or what might be termed paint coatings do not add enough to the life of the pipe to justify their use.
9. That the corrosiveness of a soil cannot as yet be accurately predetermined by the use of any one method.
10. That the corrosiveness of a soil can be fairly accurately predetermined by the use of a combination of methods.

Copper Pipe for Gas Distribution

ARTHUR F. BRIDGE
and
FREDERIC A. HOUGH
Southern Counties Gas Company of California

THE decision as to whether steel, cast iron or copper pipe is to be used, must of course be based on economic considerations.

In general, the pipe material which gives the lowest annual fixed charges and operating costs, is the one to be used. To make a quantitative comparison of the annual costs involved in using various types of pipe, it is necessary that the following conditions be fulfilled.

1. It must be possible to so install each kind of pipe under consideration, that it will be gas tight until corrosion has perforated it. Otherwise the cost of the leakage, which cannot be satisfactorily estimated, would have to be considered.
2. Reliable data concerning the probable life of each kind of pipe must be available, and
3. Accurate, comparable installed cost data must be available.

Relative Gas-Tightness of Steel, Copper and Cast Iron Lines

It appears that the construction methods that we use for copper and steel installations insure the equality of these two metals in so far as gas tightness is concerned. All steel mains and services are welded.

Copper mains and services are either brazed or the soldered-sleeve connection is used. Therefore, copper lines are also free from threaded or gasket joints.

We believe that if it is necessary to make service connections to cast iron mains by drilling and tapping the wall of the main or by using saddles, the same freedom from leakage due to mechanical defects cannot be expected with cast iron lines as with steel or copper lines.

If it is possible to make service connection to partially graphitized cast iron mains by a method as satisfactory as welding or brazing connections to steel or copper lines, this objection to cast iron is eliminated.

The Life of Gas Mains

A gas company that has been using a particular kind of pipe for a long period of years, inevitably accumulates a fund of information concerning the life of that pipe in the territory served. It is assumed, therefore, that such information is available for the pipe materials ordinarily used and that the only additional data needed, concerns copper pipe.

It was demonstrated by calculations that if the high copper alloy best suited to the soil in which it is installed is selected, and if internal corrosion is nonexistent, copper pipe can be expected to last several times as long as bare steel.

However, conditions other than corrosion, also influence the life of a gas main. Inadequacy due to increased load, changes in street grades and alignment, and possibly other contingencies that cannot initially be foreseen, may determine the life of both gas mains and services.

Because of the possible effect of these contingencies, we have assumed in our economic calculations, a life for copper pipe of 30 years, though we believe that in cases where soil corrosion is the only limiting factor, a much longer life will usually be realized.

"Under our conditions, the installed cost of small cast iron pipe is more than the installed cost of copper pipe of the same diameter. Therefore, so long as the copper market remains in its present depressed state, the cost advantages in favor of copper eliminates from consideration, cast iron of diameter less than 3"."

General Conclusions

1. In many corrosive soils the rate of corrosion of copper is less than that of steel by an amount sufficient to justify its use for gas services and for 2" and 3" mains, provided in-

ternal corrosion is not a limiting factor.

2. If, in a given soil, copper does corrode rapidly, usually an alloy high in copper content can be found to which conclusion 1, applies.
3. Copper pipe is probably unsuited for under-ground pipe in areas where stray current electrolysis is severe.
4. Copper pipe should not be used to distribute gas containing as much as 1 grain of hydrogen sulphide per 100 cubic feet, unless the gas is dry.
5. Un-dehydrated oil gas as ordinarily purified, will corrode copper pipe.
6. The corrosion of copper pipe by purified but undehydrated oil gas, is more rapid than that due to many corrosive soils.
7. Dehydration greatly reduces the rate at which the corrosive gases, normally present in purified manufactured gas, attack copper.
8. From the standpoint of both mechanical strength and soil corrosion resistance, a wall thickness of .065" (No. 16 gage) is sufficient for copper gas mains and services 3" in diameter and smaller.
9. Brazed joints are satisfactory for copper pipe in soils that do not tend to dezincify bronze.
10. Soldered copper-sleeve joints appear to be satisfactory for both mains and services in all soils.
11. When a reduction in pipe size is permissible, it is practical and economical to replace old mains and services by using them for conduits for copper pipe, thus avoiding much cutting of pavement and lawns.
12. Because of the low cost of installation, the use of copper pipe inside existing steel mains and services is fully justified, regardless of the rate at which the soil attacks steel.
13. When chemical and physical conditions are such that copper pipe can be used, it is economically sound at now existing prices, to use it for 2" and 3" mains in soils where the life of wrapped steel mains is less than 19 years, and for services in locations where wrapped steel services have an expectancy less than 22 years.
14. If the mains and services are to be installed under expensive pavement, the required life for wrapped steel mains given in No. 12 above, is increased to 22 years and that for services, to 25 years.

Domestic Appliance Maintenance Service

C. R. MILLER

Portland, Ore., Gas & Coke Company

OUR first problem was to determine the extent to which we could and should go in reconditioning appliances on the premises of our customers with ordinary tools and equipment. Also it was necessary to determine the time required to do the work. To this end all available data pertaining to the service records were examined, and questionnaires were submitted to all individuals in our company who were thought to be in a position to render opinions concerning the major items that it would be necessary to consider in rounding out the entire subject. With these conclusions at hand, a light delivery truck was outfitted with tools and equipment thought to be necessary and an operator chosen from the ranks of the service men. Our service men were then asked to and did gain the permission of a given number of our customers thought to be in need of such service, permitting us to thoroughly clean and adjust the gas appliances in use.

This maintenance man was accompanied by an engineer who made detailed time studies of all the major operations, including travelling time as well as the time on the premises. The actual work of cleaning was divided into several subdivisions thought to encompass the more important functions pertaining to the work. This engineer also made observations concerning the tools and equipment necessary or advisable, and at the same time observed the manner and approach of the maintenance man as well as the attitude of the customer prior to and following the completion of the work. In total, the engineer's mission was to submit a rounded out report that would reflect rather a vivid picture of the entire transaction, which would give us an opportunity to estimate the value of the undertaking.

It was thought that the endeavor would be manifold in its benefits, working on the theory that clean and properly-adjusted appliances would permit the customer to reap the most satisfactory benefits from the service we purport to render; that complaints would be eliminated; that more use would be made of the appliances in good working order; that the maintenance man could exercise a keen intuition concerning the replacement or possible addition of appliances.

The time studies showed that the work could be done satisfactorily on the customers' premises within a fairly reasonable length of time, and that once the work was standardized, could be done at a cost which would be attractive to the customer.

It was found that most of the customers in need of the service used only a range, or a range and water heater. A few had additional appliances such as a radiant fire, refrigerator, washer or ironer, but the first two classifications constituted the majority. Therefore, a flat price of $2.25 was established for which all gas appliances on the consumer's premises with the exception of major house heating would be thoroughly renovated and made to operate as satisfactorily as the age and condition of the appliances would permit. This service includes cleaning all burners, grates, linings, exteriors and vents; re-enameling where necessary; bronzing oven and broiler linings; and properly adjusting all burners and controls. An extra charge is made for the material only in the replacement of parts.

The cost of outfitting the truck with the tools found necessary for efficient work was about $300.00. A list of the tools is attached for reference.

A summary of the work performed to date by this truck shows 301 orders completed, totalling 473 appliances cleaned and serviced. These include 134 orders wherein a range was the only gas appliance in use, and 157 installations which include a range and a water heater. The remaining 10 orders included from one to three additional gas appliances.

The average time required to complete this work, as recapped from the time study sheets, will probably be of interest to those contemplating the introduction of such service within their own company. The work of reconditioning a range was divided into twelve parts, and the time recorded for each division as follows:

Reconditioning Ranges—average of 301 jobs

1. Preparation, arranging tools from truck, etc...	11.8	minutes
2. Cleaning top of ranges, solid top or grates....	11.7	"
3. Cleaning top burners and pilot	21.2	"
4. Cleaning areation plate, drip pans, etc.	7.3	"
5. Cleaning oven and broiler burners	19.2	"
6. Cleaning oven, buffing linings, etc.	17.	"
7. Checking and adjusting heat control	1.1	"
8. Checking gas rate, pressure, etc.	.6	"
9. Cleaning exterior of range, sides, front, and back	23.2	"
10. Enameling, painting and bronzing	15.3	"
11. Replacing broken parts	3.3	"
12. Clean up, and replacing tools in truck	13.3	"
Total time for reconditioning ranges.	151.0	minutes
Work of cleaning other appliances on job	14.	"
Travel time between jobs	38.	"

TOTAL—203 Minutes, or 3.39 Hours

(Note: Units for such operations as checking oven controls, gas rates and pressure are low for the reason that the work is not performed on all jobs.)

It will be seen from this study that about 3½ hours are required to thoroughly recondition appliances on the job, including the travelling time. The cost of the work, with the exception of what little supplies in the nature of paint, sandpaper, etc. are called for labor and truck time. Very little office overhead is chargeable to the work as a copy of the order signed by the customer is left as an invoice, and the charge is posted directly to the merchandise ledger account and entered on the current months' gas bill.

But for the economic uncertainty of the past few months during which this maintenance service has been given, we would undoubtedly have had considerably more work of that nature, and would have been able to reduce the average time somewhat, particularly that for travelling time, as more efficient routing could be obtained. However, as the work was in more or less an experimental stage, more consideration was given to the rendering of prompt service than to efficient routing.

It would be putting it mildly to say that the customers were satisfied with the service. A good many were enthusiastic, and induced friends or neighbors to take advantage of the offer. We found that the average housewife, through carelessness or lack of the proper knowledge, who did not keep her gas appliances clean, was encouraged to spend the necessary time each day, after watching the maintenance man at work and listening to his diplomatic suggestions.

Many benefits, both tangible and intangible from a company standpoint, more than offset the small loss occasioned by the low price obtained for the service. Aside from the good will and the customer satisfaction, the reconditioned appliances are being used more extensively and the number of possible mechanical complaints have been reduced. Also, sales of additional or replacement appliances have been made as a result of the timely suggestions of the maintenance man.

In all, we have found the venture to be an entirely satisfactory one from a company standpoint as well as from the customer's point of view. Now that our time study and experimental work is practically complete, we propose to give the subject the publicity to which it is entitled, and ultimately readjust the cost to the consumer to cover our bare expense incidental to the traffic.

Testing Welded Pipe Lines

R. S. FULLER
Pacific Gas & Electric Company

IN general, gas lines on the Pacific Coast are tested under air at about 100 pounds with soap and water on top of ditch and with recording pressure gage in lengths of a mile or more after backfilling. By this procedure any leaks are found and repaired before the line is completed and no time is lost after completion in making such test. Testing in this manner requires that more ditch be kept open than would be the case were testing to be deferred to the completion of the job. Whether or not the costs would differ is problematical. With the welding proving to be so nearly free from leaks consideration is being given to the elimination of the soapsud test above ground in the interest of keeping the jobs closer knit and speeding up the back end.

In order to test the welds for strength and durability, on some jobs coupons were cut across the joint approximately 1½" wide and 8" long, these were tested by bending against the weld by placing in a vise and striking with a sledge or in a press, or by a portable tensile testing machine. Coupons on a 20" line were cut in a circular shape 5" or 6" in diameter and were later cut into strips for testing. It was felt that the circular coupons could be more easily replaced as there would be less concentration of heat such as in welding both sides of the narrow strip coupons; changing the shape of the coupons did not eliminate the trouble experienced from checking in the coupon itself or cracks in the weld and dishing of the coupons was resorted to in the effort to solve the trouble; it was felt that the dishing would relieve any strains produced in replacing the coupon and remove the possibility of cracks or checking. This has not been proven to be the case, however, for even after two years service there have been small cracks in the coupons or weld attaching them to the pipe. Apparently where it is felt that tests comparable to coupon tests must be made to determine the quality of the welds it will be best to cut entire welds from the line at intervals and make various tests on strips cut from such welds. The welders will probably be kept up to a satisfactory standard if they know that welds are being cut out at random and their work may be tested at any time.

Attempts have been made to devise practical accurate non-destructive testing of welds, among those being by the X-Ray and by the stethoscope. The former is probably out of the question for pipe line welding, but the latter seems to have good possibilities. Experiments on a small scale indicate that it is possible to train testers so they will be able to differentiate between good and poor welding and in some instances to name the fault, whether the weld is burned, not completely penetrated or with included cold shuts. Tests of non-destructive sort which could be made on each joint and be depended on for accuracy would be of great benefit to the work and would be productive of increased speed and therefore lower costs.

Canada Gas Men Putting on a Fine Program

THE Tentative Papers Programme of the Canadian Gas Association reveals the following interesting and instructive contributions to be read and discussed at the forthcoming 25th Annual Convention to be held in Winnipeg, Manitoba, June 9th and 10th, 1932:—

"Carbonization by Electricity," by Col. C. F. Hirshfeld, Chief of Research, Detroit Edison Co., Detroit.

"History of Gas Manufacture in Winnipeg," by Henry Dunderdale, Sup't. of Gas Production, Winnipeg Electric Co., Winnipeg, Man.

"Methane Gas From Sewage Sludge," by R. O. Wynne-Roberts, Consulting Engineer, Toronto. Paper to be read by Mr. Archibald Blackie, Consulting City Chemist, Winnipeg, Manitoba.

"A New Development in the Waterless Type of Gas Holder," by John L. Murray, Gas Engineer, Cumberland County Power & Light Co., Biddleford, Maine.

"The Belleville Gas Plant," by R. O. Wynne-Roberts, C. E., Toronto. Paper to be read by Mr. Archibald Blackie, Consulting City Chemist, Winnipeg, Man.

"The Use of Gas for the Ignition of Oil and Coal Fuels," by Roy Soderlind, Combustion Engineer, Ottawa Gas Company, Ottawa, Ontario.

"The Unity of Utilization and Rate Making," by F. W. Satchwill, Acting Manager, Winnipeg Electric Company, Winnipeg, Man. Gas Sales.

"Making Calcium Carbide and Acetylene in Large Quantities at Shawinigan Falls, Que," by Nominee of the Shawinigan Chemicals, Limited, Shawinigan Falls, Que.

"Gas Leaks, and Supporting Gas Mains Over Cuts," by D. O. Wing, Ass't. Sup't. Distribution, Montreal Light, Heat & Power Con., Montreal, Que.

"Copper Service Pipes," by Nominee of Mueller Limited, Sarnia, Ontario.

"Oxwelding and Lindewelding Recent Canadian Pipe Lines," by D. S. Lloyd, Service Engineer, Dominion Oxygen Co., Ltd., Toronto, Ontario.

In addition to the Papers Programme, there will be an inspection of the large by-product coke ovens of the Winnipeg Electric Company.

A highly interesting entertainment programme has been provided, and many

Convention Headquarters will be Fort Garry Hotel, Winnipeg, Man.

Further information will be gladly supplied on application to the Secretary, G. W. Allen, 21 Astley Ave., Toronto, Ontario, or to Mr. Hugh McNair, President, c/o Winnipeg Electric Co., Winnipeg, Manitoba.

Pennsylvania Gas Association Holds Twenty-fourth Annual Meeting at Wernersville

TWO hundred delegates were at the twenty-fourth annual meeting of the Pennsylvania Gas Association held April 26 to 28, at Galen Hall, Wernersville, Pa. A number of excellent papers and addresses were presented and a feature was the high degree of efficiency with which the Pennsylvania gas men were able to mix pleasure with business. In this regard and as per their usual custom, valuable prizes were given at the end of each meeting by way of drawing tickets given to those delegates who reported promptly for the meeting and who remained until its conclusion.

During the distribution of prizes at the end of the first meeting a rather humorous episode occurred. In this connection, the young lady drawing the tickets from the bowl presented names which included the officers and others prominent in Pennsylvania Gas Association matters. Immediately Mr. Messenger of United Engineers and Constructors was on his feet voicing an emphatic objection as to the way the prizes were drawn and intimated that there must have been some premilinary "fixing." Then ensued considerable of a wrangle between Mr. Messenger and Chairman Calhoun Smith with the result that almost the entire meeting was in a violent turmoil. So well was this acting carried out that the second drawing was well under way before many of the men present realized that the whole matter was entirely in fun. During the redrawing among those noted as receiving prizes was Mr. Samuel Fairchild of Cruse-Kemper.

On the evening of the first day President H. Smyser Bair, York, Pa., delivered an address on the record accomplished and the good work being done by his Association; whereupon followed a message by A. Gordon King of A.G.A. in which he complimented the Pennsylvania group on their good work and outlined a number of fine services which the A. G. A. is doing for the industry at large.

Talk by Paige

Among the principal speakers at the banquet wast Clifford E. Paige. Vice-President, Brooklyn Union Gas Company, who spoke of some of the problems confronting the industry, particularly problems emanating from the business depression and brought out that executives must become conscious of the need for more and better selling methods. As regards electric competition, he said we must depend on energetic selling routine to win our way.

Mr. Paige was followed by Dr. Francis Harvey Green, Headmaster of Pennington School, who in a very humorous vein spoke of the necessity of cooperating and getting together in all walks of life if we are to get out of the present depression and forge ahead.

A fine paper "House Governors and Their Effect on Unaccounted-for Gas," was read by A. W. Johnston, Jr., of the Harrisburg Gas Company. This paper is presented in full in the present issue. Those discussing Mr. Johnston's paper included Paul Fusselman, E. G. Boyer and a number of others.

Purging with CO_2

"Purging with CO_2 and Explosive Limits of Illuminating Gas and Air," was read by R. G. Rincliffe of the Philadelphia Electric Company and a very valuable discussion of the problems of purging holders was given by Mr. Herbert W. Alrich of the Consolidated Gas Company of New York. During Mr. Alrich's discussion he spoke of the experiments his company is running along the line of introducing gas oil into the holder in order that the same might absorb certain vapors which might possibly give rise to explosion and which vapors might perhaps be overlooked by some men when purging the holder. Mr. Alrich also stated that in purging holders the greatest care should be taken in supervising and taking care of the job, pointing out that a disastrous explosion might make all the difference in the world as regards the public's attitude towards the state of the holder. Part of the paper follows herewith:

"It is believed that all gas plants should be equipped with adequate and reliable apparatus for purging with inert gas. Modern plants would not be operated without sufficient fire-fighting equipment of such necessary safety devices as gas masks and goggles. Improper purging methods may result in very serious property damage and loss of life. Instances of this may be recalled by every operator.

"Bottled carbon dioxide is probably the best source of inerts for small plants, where purging is infrequent and the equipment of small cubical capacity. As has been suggested, several bottles of CO_2 may be kept on hand, stored in a rack and connected to a manifold, which may be quickly connected up to the apparatus to be purged.

"Larger plants may justify the installation of an inert-producing plant. The gas-burner type of producer is probably cheapest, but the gases must be used as made, since the equipment includes no means of comprising and storing inerts under pressure. In a plant where inerts are used for purging purifiers, etc., it is desirable to have a supply of inerts stored under pressure. This reduces the time of purging when taking boxes off and placing them in service after cleaning.

"Speed is desirable when there is not a large excess of purifier capacity. In this case the gas-engine-compressor installation is ideal. Inerts may be produced at a comparatively low rate, reducing the size of the engine-compressor unit necessary, and stored in a pressure tank. Small lines may be run to the locations where inerts are used."

Mr. J. A. McBride, United Engineers & Constructors, Inc., contributed some valuable information in his paper "Design and Construction of High Pressure Transmission Mains."

Mr. George E. Whitwell, vice-president of the Philadelphia Electric Company, spoke extemporaneously on the subject of "Public Utility Merchandising." In this talk he went into the details of the work his committee has done in the State of Pennsylvania in order that dealers might be properly advised and enter wholeheartedly and efficiently into the business of marketing gas appliances.

Mr. Whitwell brought out that our big problem is not so much the development of new customers as it is raising the meter consumption of the customers already on our distribution system. He further emphasized that many of our co-workers who have worked shoulder with us for many years can only be secure of their jobs by making customers gas conscious and assisting in every way in furthering the sale of more gas.

At the evening meal of the second day Mr. Thos. F. Kennedy, of Henry L. Doherty & Company, delivered an address, "The Trend of Competition Upon the Gas Industry."

Final sessions were presided over as follows: Accounting, A. S. Corson, during which session the following papers were read, "Internal Reports," by Wm. F. R. Munnich, Philadelphia Electric Company; "Sales Analysis," by J. I. Blanchfield, Brooklyn Union Gas Company; "House Heating and the Commercial Department," by W. G. Murfit, Philadelphia Gas Works Co., Philadelphia, Pa. New business presided over by J. Ward Crankshaw produced the following paper "Air Conditioning," by S. H. Baldwin, The Bryant Heater & Manufacturing Company.

Students Study Refrigeration and House Heating

Members of a class studying Institutional Management at Pratt Institute, Brooklyn, N. Y., learned some significant facts pertaining to gas refrigeration and house heating through special lectures delivered recently. The lectures were given by J. Percy Conklin, Sales Instructor, and F. T. Bailey, House Heating Division, both of the Brooklyn Union Gas Co.

Mr. Conklin also delivered a lecture on gas refrigeration before a group of school teachers taking an advanced course in Home Economics at the Institute.

Twenty-Seventh Annual Convention of Mid-West Gas Association

PLANS for improving relationships between gas appliance dealers and utilities, sales promotion, advertising and means to be taken to prevent the further enactment of legislation to prevent the sale of appliances by utilities, were the high lights of discussion at the twenty-seventh annual convention of the Mid-West Gas Association April 11, 12 and 13 in St. Paul, Minn.

More than 200 delegates and visitors attended the convention the business sessions of which were held in the Hotel St. Paul. W. E. Derwent of Rockford, Ill., was elected president at the annual election which was held during the morning session of the first day. Mr. Derwent succeeds S. K. Swanson of Minneapolis.

Other officers elected include: R. L. Klar of Des Moines, first vice-president; C. T. Williams of Sioux City, second vice-president; R. B. Searing of Sioux City, Iowa, was re-elected secretary-treasurer. New members of the executive council elected include: R. L. Schact of Lincoln, Nebr., N. J. Roberts of Buffalo, N. Y., S. D. Whiteman of Sioux Falls, S. D., and George Lynch of Fargo, N. D.

Address by Forward

Alexander Forward, managing director of the American Gas Association, was the first speaker of the opening session. His topic was, "Our Working Tools." He said in part:

"Historical sharks tell us that the first authentic recorded use of gas for cooking was about 1830 or 1832 when James Sharp of Southampton, England, demonstrated the possibility of satisfactory gas cooking.

"Sharp kept up, for 20 years at least, a steady interest, for by 1850 he had arrived at the point of making speeches about it having prepared a lecture entitled 'Gastronomy' in connection with which he roasted a large quantity of meat and cooked a variety of vegetables, puddings and pies, with an expenditure, we are told, of 156 cubic feet of gas.

"A couple of years following Sharp's demonstration, John Barlow of Islington, a part of London, had an apparatus for roasting, boiling and steaming installed in his kitchen. This was a sort of tin oven about four feet high and a foot and a half square which near the bottom ran a small gas pipe fitted with small burners about an inch apart.

"A joint of meat was suspended and revolved while cooking. On a stand near the oven were two or three rings of piping, with burners, and over these were placed the boilers and saucepans. This contrivance was said to work admirably.

"Gas cooking reached America shortly after 1850 and there has been a steady development in the gas range until today it has gone 'completely modern.' Every home that can afford a radio, can even better afford a gas stove and modern cooking equipment."

A luncheon for the delegates and their friends was served at noon the first day in the grand cafe of the Hotel St. Paul.

The afternoon session was given over to three addresses dealing largely with the question of the relationships between appliance dealers and utilities. The purpose of the talks was to promote closer cooperation between the small company selling appliances and the sale of these same appliances by the gas utilities.

A. E. Harroun of Minneapolis, representing the Master Plumbers' Association of that city, was the first speaker. He told of the experience of his organization in dealing with the utilities and said that he believed cooperation between the two would lead to larger profits for the small dealer in appliances.

Thomas E. Bullion, sales director for the Detroit-Michigan Stove Co., of Detroit spoke on, "The Hows and Whys of Dealer Relations." The assistance which utilities can offer in the financing of sales for small dealers and in servicing equipment after it has been installed and the necessity for standard equipment were discussed by Mr. Bullion.

"One of the greatest evils of today in the sale of appliances and equipment," Mr. Bullion said, "is the trade-in. Many dealers are robbing themselves of legitimate profits by making too large allowances for old stoves and equipment. The time will come when this practice will be eliminated."

The trade-in from the standpoint of the utilities, Mr. Bullion said, is a constant source of trouble. Old stoves and equipment require more servicing by the utilities and do not give efficient service to owners who have purchased them.

Higgins Reviews Laws

A. E. Higgins of Dallas, secretary of the Natural Gas department of the American Gas Association, reviewed the effect of laws in several states, notably Kansas, which prevent the sale of appliances by utility companies.

"The law is a detriment to the individual or small dealer," Mr. Higgins said, "and has been clearly demonstrated as such in Kansas. I anticipate that it will be repealed in that state."

A dancing party in the Casino of the Hotel St. Paul concluded the first day's activities.

"Gas Measurement and Pressure Regulation at High Pressures," was the subject of an address the morning of the second day by Allen D. MacLean, chief engineer, Pittsburgh Equitable Meter Co., of Pittsburgh, Pa.

Jack Fagan of the Fagan-Andrews Co., of Milwaukee, Wis., spoke on "Water Heating Sales." C. A. Nash, vice president in charge of sales promotion for the United Light and Power Engineering and Construction Co., of Davenport, Iowa, talked on the problem and the best means for increasing residential gas sales.

In the afternoon session, Herman A. Groth, vice-president of the William H. Rankin Co., of Chicago, advertising agents, spoke on "Sales Promotion Through Advertising."

"We have been taking it on the chin pretty steadily now—our knees are just a wee bit wobbly—some are calling for the smelling salts—and I suppose many of us would be yelling for the sponge if we could afford to own one.

The Old Boat of Business

"There is no doubt that the old boat of business has been smashed from all sides, but I believe we can be confident that the bottom of the boat is still safe, and that the old expression of the farmer-philospher in Kansas still holds good: 'It always rains after a long dry spell.'

"One of the absolutely essential requirements of successful building at this time is to swear by the Gods of Common Sense that there shall not be another dollar's worth of product manufactured that will not be sold at a profit.

"Only about thirty days ago, I had the privilege of going through a plant of a leading gas appliance manufacturer and I was utterly astounded at the news which the new models had in them—the style, the time-saving features, the convenience—all excelling anything that I have ever seen pictured in any periodical or heard talked about over any radio station.

"Your sales promotion through advertising is going to depend very largely on the thoroughness with which you apply your knowledge of the people whom you serve—your prospective customers—knowing what per cent of your population are prospective customers for the various items you sell.

"The big battle to win the selling-below-cost championship of America is a prize that we can well afford to let the other fellow have.

"Finding the right message that millions will remember and repeat, finding the message that conveys the most effective points of the sales story, is one of the fundamental steps in sales promotion through advertising."

Other speakers on the afternoon program the second day included: J. T. Schilling of Des Moines, Iowa, representing the Des Moines Gas Co., and E. J. Boyer, sales manager of the Minneapolis Gas Light Co.

A stag dinner and entertainment program concluded the second day.

The question of natural gas in the middle west was discussed Wednesday morning by H. J. Carson representing the Northern Natural Gas Co., of Omaha, Nebraska.

Mr. Carson outlined the progress which has been made in natural gas construction in the past two years and speaking of his company said in part:

"We now are serving a total population of more than 470,000 persons in 96 communities, in Nebraska, Iowa, South Dakota and Minnesota. Gas is transported through 1,667 miles of pipe lines in these states and our company serves also a population of 25,000 persons in fifteen communities in Kansas through 243 miles of lines.

"Only a few years ago the possibility of natural gas for the middle west was so remote that it was seldom if ever referred to.

"The discovery of enormous natural gas reserves in the Panhandle or Amarillo field in Texas and what is known as the Hugoton field in Kansas, together with improvements in pipe line construction and gas compressor stations, made natural gas service possible for the states represented in your convention.

"Large reserves insuring a supply over a relatively long period of years were the first essential. We now are confident that natural gas will contribute substantially toward the upbuilding of industries in this section. It also will attract other industries and we should see an increase in the number and kind of products manufactured in the area served."

Frank A. Lemke of the Humphrey Co., of Kalamazoo, Mich., Robert L. Klar of the Des Moines Gas Co., and John K. Swanson of Minneapolis, retiring president, also spoke.

Convention sessions were concluded at noon and a meeting of the new council after lunch marked the end of the convention.

The association voted to hold its meeting next year in Des Moines.

EQUIPMENT NEWS

Volume Gas Heating and Air Conditioning Market

The Forest City Foundries Company, Cleveland, Ohio, have just issued a bulletin titled "Volume Gas Heating and Air Conditioning Market" which contains a fund of valuable information on the subjects. It also describes the Niagara Junior Auxiliary Gas Furnace, which has been designed for all or part time house heating. For part time heating the Niagara Auxiliary is installed on either side of the hot air furnace in use, without change in the furnace or piping system. It is ready for immediate use whenever wanted, giving an instant change from coal to gas, or gas to coal. They state that:

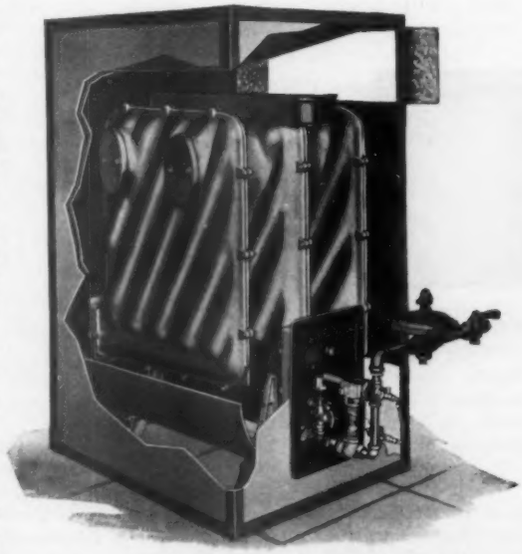
"Part time heating with Niagara Auxiliary enables Mr. Average Homeowner to enjoy the luxury of gas heat nearly all winter at ordinary heating cost.

"There are five times more prospects in the average home owner class than in the class of larger incomes. Five times more prospects for part time heating.

"Five part-time heating consumers, even though each might use only half as much gas as one full winter consumer, are worth two and one-half times as much in annual load.

"And PART-TIME HEATING leads to full-winter heating, bringing you full-time consumers you might never reach in any other manner."

The scientific principle of extracting heat from the burned gases gives Niagara Auxiliary unusual efficiency and economy. The hot gases from the main burner rise in the center radiating section and pass into the side sections, where they fall as the heat is extracted by the circulating air. At the bottom, with only enough of their heat left to insure proper draft, they are drawn into the vertical vent hood at the rear. The circulating air "scrubs" heat from the sides of radiating sections, is exposed to intense heat at the top, and passes into the distributing ducts.



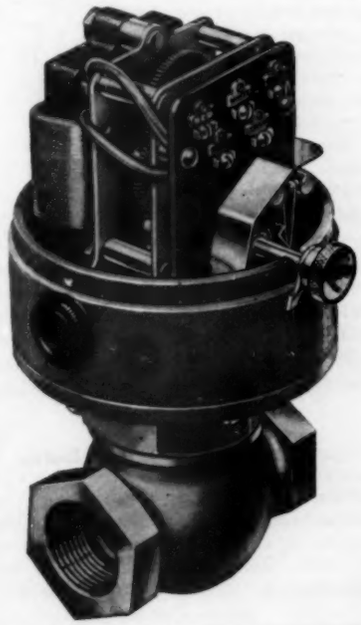
Niagara Junior Auxiliary Gas Furnace

Niagara Auxiliary Furnaces are built in four sizes with capacity for every size and type of home.

Copy of bulletin will be mailed on request.

Specialized Controls for Gas Industry

The L. R. Teeple Co., Portland, Ore., announce a new line of specialized controls for the gas industry. Featured in the Teeple line, which included temperature and time controls and limiting devices are motorized gas valves for gas heating systems both industrial and home



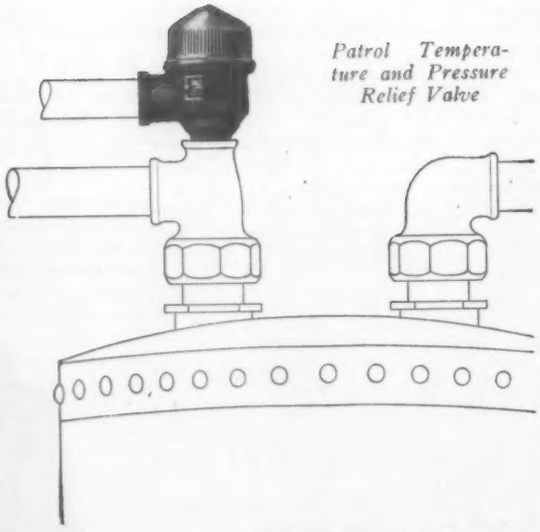
Teeple Motorized Gas Valve Type "S"

installations. Two distinct types of valves are manufactured. Type S, illustrated here, serves only to control the flow of gas. Small and simple, this valve is designed especially for water heaters, room heaters and small furnaces where sure and positive gas control is essential, but where auxiliary equipment is unnecessary. It operates on the open circuit principle, and uses no electrical energy except during the few seconds while it is opening or closing.

A larger valve, known as the Teeple Type D valve, is completely equipped for the control of conversion burners, large furnaces and small boilers. It includes as optional equipment a damper arm for primary air doors and a mercury tube type switch of ample rating for the control of furnace fans or other auxiliary equipment. Full provision for safety is secured through a special application of the closed circuit principle, without sacrificing the many advantages of the standard open circuit thermostats and other control instruments.

Sturdy construction of the equipment has been proved by factory tests. After 1,500,000 operations, equivalent to 50 years of service, the valves show remarkably little wear. The Teeple Company recently issued a catalog on the new line, copy of which will be mailed on request.

Temperature and Pressure Relief Valve



Patrol Temperature and Pressure Relief Valve

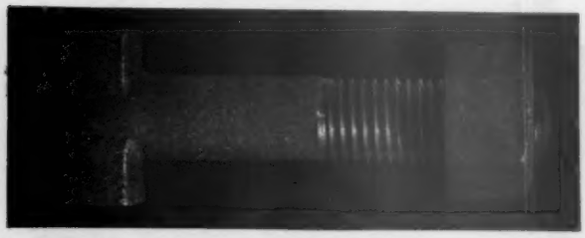
The Patrol Valve Co., Cleveland, Ohio, have put on the market a relief valve designed to protect against both high temperature and excessive pressure conditions in domestic hot water supply systems and known as The Patrol Temperature and Pressure Relief Valve. This device allows water to relieve from a storage tank or range boiler when either the temperature or pressure within the tank exceeds a predetermined setting.

Temperature relief is provided by a replaceable temperature control disk having port holes filled with fusible metal. This metal melts at a predetermined temperature and thus provides a passageway to the outlet of the valve. A stainless steel spring provides pressure relief by yielding and permitting the relief of water, when the pressure of the system exceeds the pressure setting. Standard settings are 212 degrees and 140 pounds. Settings different from standard can be obtained on request.

The accurate settings for temperature and pressure relief and the full flow water relief openings make the Patrol Relief Valve fully capable of meeting all conditions brought about by excessive temperature and pressure.

Cast Iron "Zee-Metal" Bolts

The American Cast Iron Pipe Co., Birmingham, Ala., announce the completion of an exhaustive series of tests of cast iron "Zee-Metal" bolts, which enables them to furnish a 100% cast iron joint in their "Simplex" products, including Mono-Cast Doublex Simplex Pipe, Monoloy Doublex Simplex Pipe, and Simplex Prepared Joint Pipe.



In these tests, the Cast Iron "Zee-Metal" Bolts developed a minimum ultimate tensile strength of 75,000 lbs. per sq. in., and a minimum "yield point" of 55,000 lbs. per sq. in., without displaying any tendency to "stretch" or strip the threads. The accompanying photograph illustrates the perfect threading possible with this bolt, which is furnished "finger tight."

Because of the fact that this bolt combines the well known corrosion resistance of true grey cast iron with physical properties superior to other bolts commonly used in bolted cast iron pipe joints, the manufacturers state that Cast Iron "Zee-Metal" Bolts may be expected greatly to broaden the field of usefulness of cast iron pipe. Those desiring further information are invited to write direct to The American Cast Iron Pipe Company, Birmingham, Ala.

Electrolux Refrigerator Sales, Inc. Announce the Electrolux Ice Cream Cabinet

Five years ago, Electrolux opened up the field of automatic household refrigeration to the gas industry. It provided the means by which the gas industry could enter and get its share of the load to be derived from this new and profitable field.

And now, Electrolux with a complete new line of seven ice cream cabinets has opened up another new field to the gas industry. It is a field that promises to be a profitable one from a load building standpoint. The load ranges from 22,000 to 60,000 cubic feet per cabinet per year. Ice cream cabinets are in operation all year round.

The following is a partial list of outlets for ice cream cabinets:

Drug stores, confectionery stores, restaurants, hotels, department stores, and all other dispensers of ice cream.

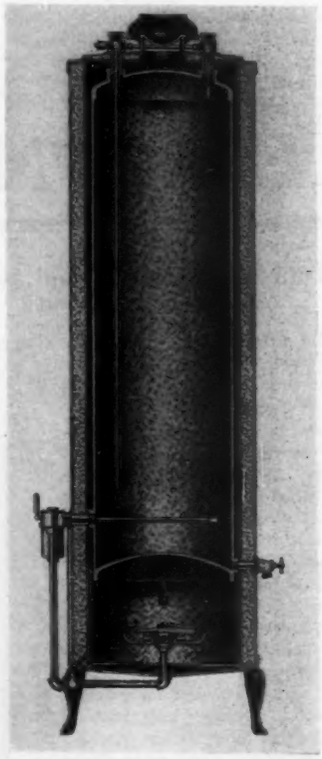
The feature of these cabinets are:

No machinery—no noise, freedom from maintenance cost; freedom from trouble; unvarying low temperature; low operating cost; exclusive construction features—built for long service. No brine tank—corrosion and leakage eliminated. No assembling or charging on customers' premises. Shipped ready for immediate installation.

These features are responsible for the fact that gas refrigeration has taken its place as one of the leaders in the field of automatic refrigeration. Address Electrolux Refrigeration Sales, Inc., 51 E. 42 St., New York, for printed matter.

New Model EverHot Water Heat

The EverHot Heater Sales Co., Detroit, Mich., announce a new automatic water heater. Many refinements and improvements have been made, and include as standard equipment pilot safety, pressure safety, gas filter and exclusive leakage by-pass and temperature safety cut-off.



Sectional View EverHot Automatic Water Heater

The gas filter prevents foreign matter from interfering with the proper operation of the heater.

The leakage by-pass prevents the waste of gas due to leaking or dripping hot water faucets.

The Temperature Safety Cut-off is a positive safeguard against the overbuilding of temperature beyond a definite predetermined point. It will shut off all gas to the burner if the temperature of the water should reach an abnormal degree.

Another feature is the Air Preheater. The heat absorbed by the shield in the base of the heater preheats the air for combustion as it passes under the shield to the burner. Preheating the air results in increased efficiency. The air for com-

(Continued on page 64)

NEWS *of the* GAS INDUSTRY

Natural Gas Service for San Diego

Construction of a 12-inch pipe line from Huntington Beach to La Jolla, roughly seventy-five miles, by Southern Counties Gas Company is scheduled to start in the near future. The work will cost approximately $1,000,000 and will furnish natural gas for San Diego and its surrounding territory. The project is scheduled to be completed by September.

When finished it will mean that from near the Mexican border to within 250 miles of the Oregon state line the state of California will be receiving natural gas from its gas and oil fields for domestic and commercial uses.

At present natural gas is being supplied as far south as San Clemente. The size of the pipe line furnishing the area south of Huntington Beach to San Clemente is too small, however, to handle the amount figured necessary for the San Diego territory, which is covered by the pipe lines of the San Diego Consolidated Gas and Electric Company as far north as Oceanside.

Negotiations with Southern Counties Gas Company resulted in an agreement to deliver gas to La Jolla. From that point into San Diego and then out again over its territory, the San Diego Company will carry the natural gas furnished by Basin, Coastal, and San Joaquin Valley fields.

San Diego is the last large potential market in the state not now served by natural gas, and with the new service over 95 per cent of California domestic customers will enjoy this natural product.

Plan Extension of Service

The Iroquois Gas Corporation has been authorized by the New York Public Service Commission to construct a gas plant in a portion of the town of Eden, Erie County.

The company will extend its service from the town of Hamburg, where it now serves, into the town of Eden, to serve some prospective customers who have residences and farm greenhouses, and who have applied to the company for service.

Change in Ownership

The Peoples Service Company of Connersville, Ind., now is under the same management as the Public Service Company of Indiana. P. A. McLeod, division manager of the latter company stated that officials of the Public Service Company of Indiana, which provides electric service here, have taken over the operation of the local gas plant with E. J. Britsch as manager. The former company was under management of an Ohio company.

National Advertising Campaign

Plans for the institution of a national advertising and promotional campaign for the stimulation of a greater use of gas and gas burning appliances, involving the expenditure of approximately $6,000,000 in excess of current advertising expenditures, over a period of the next three years are announced by John A. Fry, Detroit, Michigan, chairman of the national advertising committee of the Manufacturers' Section of the American Gas Association.

The National advertising, which is expected to be started this summer has been endorsed by the Executive Board of the American Gas Association, according to Alexander Forward, managing director, and will be financed and directed by the appliance manufacturers national advertising committee.

Philadelphia Company Issues Annual Report

The annual report of the Philadelphia Company and subsidiary companies for the year ended December 31, 1931, shows consolidated gross earnings totaling $56,036,779, a decrease of $5,484,265, or 8.91 per cent, and net earnings including other income, before appropriations for retirement (depreciation) reserves were $29,670,360, a decrease of $1,799,019, or 5.72 per cent. The balance available for dividends after appropriations for retirement (depreciation) reserves, amortization and other reserve funds was $14,278,285 for the year 1931 compared with $15,330,103 for 1930, a decrease of $1,051,818.

During the year the Equitable Gas Company put into effect supplemental rates for large industrial customers which apply to off-season uses and special applications such as iron and glass melting. The purpose of these rates is to stimulate the demand for the use of gas service, according to Frank R. Phillips, president of the company.

Net construction expenditures during 1931 for all companies in the Philadelphia Company system amounted to $2,952,539. There were no major additions undertaken during the year, activity being confined largely to improvements and additions designed to further the efficiency and economical operation of the physical plant.

Convention Calendar

May

24-26 Ninth New York Regional Gas Sales Conference, Lake Mohonk Mountain House, Lake Mohonk, N. Y.

June

3-4 American Gas Association Executive Conference, Traymore Hotel, Atlantic City, N. J.

6-9 Seventeenth Annual International Convention and Inform-a-Show of the National Association of Purchasing Agents, Book-Cadillac Hotel, Detroit, Mich.

7-9 Institution of Gas Engineers, General Meeting, London, England.

9-10 Canadian Gas Association, Winnipeg, Manitoba, Fort Gary Hotel. G. W. Allen, secretary.

19-23 Annual convention Public Utilities Advertising Association, New York, N. Y.

27-29 Semi-annual meeting American Society of Heating and Ventilating Engineers, Hotel Pfister, Milwaukee, Wis.

July

5-7 Michigan Gas Association, annual convention, Mackinac Island, Mich. Albert G. Schroeder, secretary-treasurer.

August

24-26 Pacific Coast Gas Association, Del Monte, Calif.

October

10-14 American Gas Association, Atlantic City, N. J.

Asks Permission to Operate Gas Company

Howard Evans, operator of the Gwynneville Natural Gas Company of Shelbyville, has filed a petition with the Indiana Public Service Commission asking to operate the Manilla Natural Gas Company at Manilla, Ind. He purchased the company at receivership five years ago, but ceased to operate it as a public utility in 1931. He desires to repair the property and establish a rate of 60 cents a 1,000 cubic feet.

Files Petition for Receivership

A new petition for receivership for the Kentucky Natural Gas Company, a subsidiary of the Missouri-Kansas Pipe Line Company, both of which are in the hands of receivers, has been filed in Federal Court, Indianapolis, by interests representing bondholders.

Colorado Tests Rates

Under the recent Supreme Court decision holding that states have the power to investigate the reasonableness of wholesale rates upon which retail gas prices are based, the public utilities commission of Colorado has ordered an investigation of the 40 cent charge made for natural gas to companies distributing in the smaller communities of the northern part of its state. At the present time the city line price for Denver is 17 cents per M and the commission proposes to determine whether the higher rate of 40 cents charged at the city limits of northern communities is reasonable. The city of Denver, utilities of which are not under the jurisdiction of the state commission because of home rule laws, will join in the investigation.

Gas Industry to Have Exhibit at Plumbers Convention

The National Association of Master Plumbers will hold their 50th Annual Convention in Madison Square Garden, New York City, June 20-23, 1932. In the spirit of promoting plumbing-dealer relationship, a cooperative gas industry exhibit will be made, sponsored by the Consolidated Gas Company of New York, Brooklyn Union Gas Company, the Public Service Electric & Gas Company, Kings' County Gas Company, Brooklyn Borough Gas Company, New York and Richmond Gas Company, and the American Gas Association.

The gas exhibit will include a display of gas company sales and advertising methods and material as well as featuring interesting information on laboratory approved appliances. The participating companies and others in our industry are assisting in a publicity campaign, to the extent of using stickers and window posters. Advertising will be featured in a number of trade papers.

A number of our manufacturer company members have already reserved space, including: American Radiator Co., American Stove Co., Crane Co., Electrolux Refrigerator Sales Inc., Faraday Refrigerator Corp., Hotstream Heater Co., Kompak Co., Roberts & Mander Stove Co., and the Ruud Manufacturing Co.

Midland United Company Earnings Per Share

The surplus earnings of the Midland United Company applicable to Common Stock amounted to $1,313,470.51 in 1931, which is equivalent to 30 cents per share on 4,333,302 shares, the number outstanding at the end of the year. This compares with per share earnings of 90 cents on $3,546,528 shares, the total outstanding at the end of 1930.

On the basis of 3,870,202 shares, the average number outstanding during 1931, the surplus earnings of the company are equivalent to 34 cents, compared with $1.05 earned on 3,039,257 shares, the average number outstanding in 1930.

Gifts Come From Profits Under New York Rules

Gifts to charity may not be charged as an operating expense under a ruling of the Public Service Commission of New York State made in the case of the New York Telephone Company. Under this regulation the company must charge such donations against corporate surplus and, therefore, take them from the profits otherwise distributable as dividends.

"The amount available for dividends is not affected by whether the charges are included in operating expenses or deducted from surplus," the order stated. "The essential difference is that when they are placed in operating expenses they become part of the cost of the service which is to be borne by the telephone subscribers.

"In all rate cases, operating expenses are the basic element, and the New York Telephone Company in its proceedings before the Commission and the courts has uniformly submitted, as proof of confiscation or justification of its rates, its operating expenses without eliminations or deductions for donations.

"Of course, the nub of the matter is that by submerging those gifts in operating expenses they will not be so apparent to any one who examines the reports of the New York Telephone Company as they would if they appeared in the surplus account; and further, that in any matter involving the reasonableness of rates of the New York Telephone Company these expenses would be a charge against subscribers and not the stockholders."

Utilities Power & Light Declares Regular Preferred Dividend

The Board of Directors of Utilities Power & Light Corporation at a meeting recently declared the regular quarterly dividend of $1.75 per share on the 7% Cumulative Preferred stock of the company, payable April 1, 1932, to stockholders of record March 15, 1932. Action on the payment of the quarterly dividends on the Class A, Class B and Common Stocks was deferred.

In commenting on the action, President Clarke said: "While it is estimated that the earnings on the Class A Stock will be in excess of the annual dividend requirements of $2.00 per share, the Board of Directors deemed it advisable to conserve the Company's cash at this time."

Some Natural Gas Figures

John G. Marzel, state geologist of Wyoming, in his report for the year of 1931 shows that the value of Wyoming's mineral production was $30,178,000 as compared with $46,750,000 during 1930. However, natural gas increased in 1931 both in production and valuation, the production registering 37,860,470,556 cubic feet and the valuation $1,514,418.

West Ohio Gas Co. Report Operating Revenue for 1931

Operating revenue of the West Ohio Gas Company for 1931 was $704,630.56 compared with $725,287.69 in 1930, according to the annual report of the company made public recently.

Net income of the company for the year after deducting operating expenses, taxes, interest on funded debt and other charges totaled $113,582.08, compared with $105,139.59 in 1930.

The West Ohio Gas Company, which supplies gas service in Lima and ten other western Ohio communities is controlled by the Midland United Company.

Sales School at Brooklyn Union

Ten salesmen employed by gas appliance dealers operating the Brooklyn Union Gas Company territory recently attended the first sessions of a new school opened by the company. The school has been planned to provide expert instruction in gas appliance salesmanship for members of the dealers' sales forces and is held Mondays of each wek.

The curriculum is so arranged that a salesman will receive the complete course of instruction in one day. A new group will be formed to take the course each succeeding week.

To increase the public's confidence in approved dealers by enabling the salesmen to obtain a broader knowledge of gas appliances is the principal purpose of the New Business Department in inaugurating the school. It is hoped that the instruction will make the salesmen more effective, thus increasing their usefulness to themselves and to the dealers for whom they work.

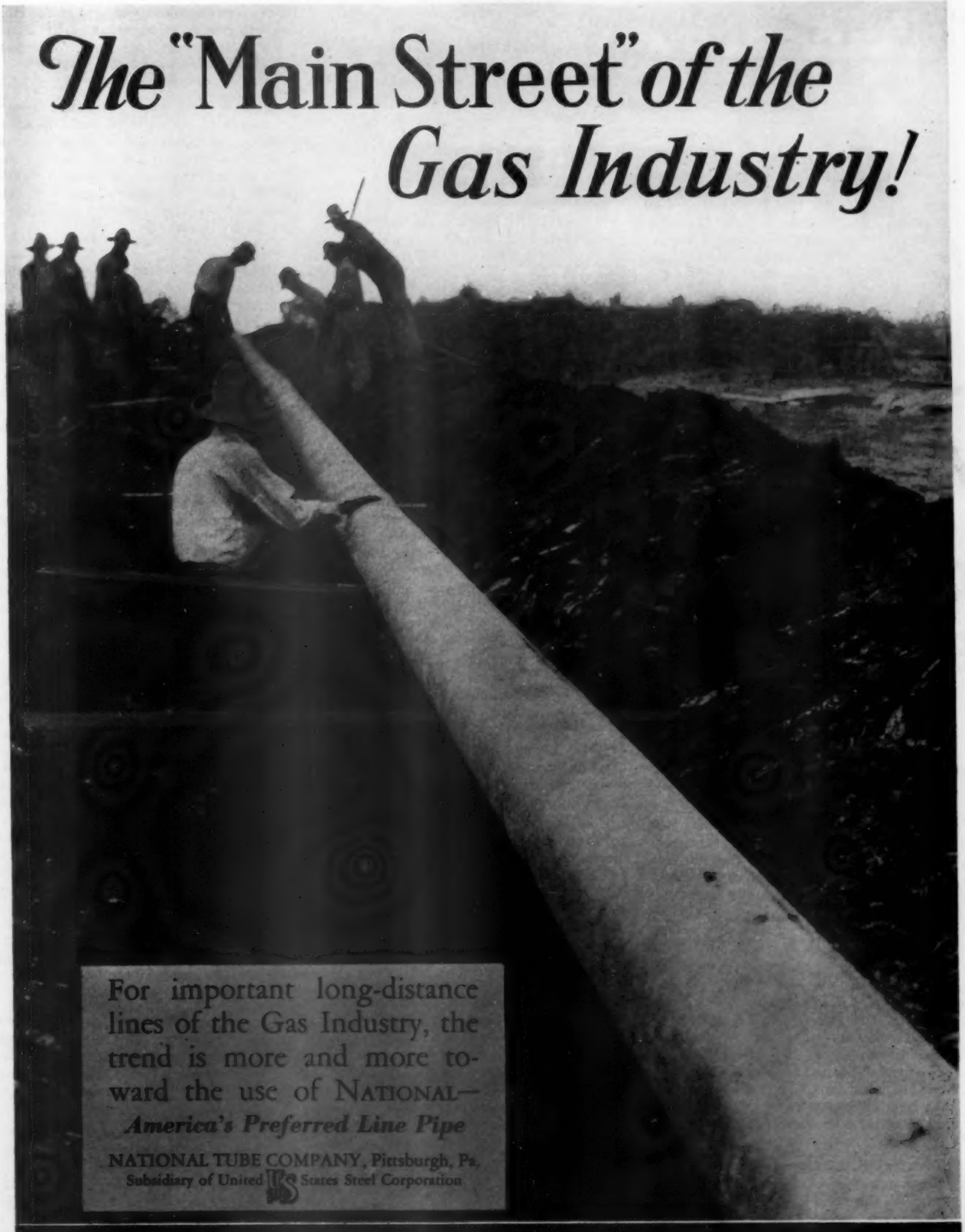
J. Percy Conklin, Sales Instructor, is in charge of the school. The entire morning of each day is devoted to lectures and discussions of gas refrigeration. The history, principles and construction of the gas refrigerator are discussed, and suggestions offered as to the best method of conducting interviews. The early part of the afternoon is given over to a similar discussion of water heaters, following which the salesmen take up a study of the different types of gas ranges. The program ends with detailed instruction on how to prepare order blanks and time-payment contracts, hints on canvassing and selling, and an outline of opportunities awaiting salesman.

Declare Quarterly Dividend

The board of directors of the Northern Indiana Public Service Company have declared regular quarterly dividends on all classes of its preferred stock for the first quarter of 1932.

Answer to Starbuck's Rebus—"You can't make good records with bad apparatus."

The "Main Street" of the Gas Industry!



For important long-distance lines of the Gas Industry, the trend is more and more toward the use of NATIONAL—
America's Preferred Line Pipe
NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

NATIONAL PIPE

Personals

John A. Malone, who has been Manager of the Industrial Division of the Consolidated Gas Company of New York, has been promoted to Assistant General Sales Manager.

Mr. Malone takes the position left vacant on March 1, when George Ostlund was made General Sales Manager.

Paul Dorchester, formerly Assistant Manager of the Industrial Division, has been advanced to Manager of that Division.

Mr. Malone graduated from Stevens Institute of Technology in 1912, with the degree of Mechanical Engineer. He joined the Consolidated Gas Company of New York in April, 1930, as a sales engineer in the House Heating and Water Heating Division, specializing on large volume water heating. He became Assistant Manager of the Industrial Division in December, 1930, and Manager in March, 1931.

Mr. Dorchester is a graduate of Boston University with a degree of Bachelor of Arts, and also of Ohio State University, with a degree in Mechanical Engineering. In March, 1927, he joined the Consolidated Gas Company of New York as sales engineer. He became Assistant Manager of the Industrial Division in March, 1931.

Alfred May has been appointed Assistant Commercial Manager of the San Diego Consolidated Gas & Electric Company, San Diego, California. Mr. May was formerly in charge of the Investigation Department.

E. E. Andres, formerly a member of the Detroit City Gas Company, has just been appointed in charge of refrigeration sales by the Grand Rapids Gas Light Company. Mr. Andres has taken over full charge of the refrigeration department reporting directly to G. Halliday, Sales Manager.

In his new position, Mr. Andres is especially well qualified with several years experience in the utility field and has had specialized training in refrigeration sales. In addition to his work with the Detroit City Gas Company he was formerly employed by the Michigan Federated Utilities at Marshall in the new business department. Previous to that time he was a buyer in one of Detroit's largest mercantile concerns.

Charles P. Balsam succeeds E. L. Callaghan as director of appliance sales of the Washington Gas Light Company, Washington, D. C. Mr. Callaghan resigned recently.

W. C. Merritt succeeds W. B. Currey as district manager of the United Gas Public Service Company at Beaumont, Texas. Mr. Merritt was formerly manager in Marshall, Texas.

O. K. Shannon, Sr., vice-president of the Lone Star Gas Company, Fort Worth, Texas, recently resigned his position. Mr. Shannon was president of the Fort Worth Gas Company at the time it was taken over by the Lone Star Gas Company.

H. H. Barr, manager of the Bloomfield, Ind., district of the Public Service Company of Indiana, has been transferred to the Princeton office succeeding John Parrett, resigned. Joseph Jarvis, now manager of the Petersburg district, will succeed Mr. Barr at Bloomfield.

Frank A. Woodhead, vice-president in charge of operation of the Washington, D. C., Gas Light Company resigned his position recently.

Ray C. Hazlett has been appointed Manager of the Electrolux Department of the Minneapolis Gas Light Company, according to announcement made by E. J. Boyer, Sales Manager. In addition to his new duties Mr. Hazlett will continue as Manager of the Range Department which he has been operating very successfully for the past three years.

Mr. Hazlett has been connected with the Minneapolis Gas Light Company since 1915. His first 10 years were spent in the general offices and he was later promoted to the sales department where he quickly won an enviable record.

Eugene L. Keating has been appointed manager of the newly created merchandise sales department of the Seattle Gas Company, Seattle, Wash.

J. G. Longsdorf has been appointed assistant manager of the Oklahoma City district of the Oklahoma Natural Gas Corporation.

Frank H. Morris was recently named special representative of the Virginia Gas Distribution Corporation with headquarters at Clifton Forge, Va.

C. R. Logan, who is in charge of the Refrigeration Sales Division of the Philadelphia Gas Works Company, was recently honored at a surprise luncheon party arranged by the District Supervisors and other members of the Refrigeration Division at the Adelphia Hotel. Coming as a complete surprise to Mr. Logan, the luncheon was given as a mark of appreciation for his able efforts to advance the sale of gas refrigeration in the City of Philadelphia.

A beautiful, heavy bronze ship's-clock, suitably engraved, was presented to the guest of honor by John E. Harkins of the West Philadelphia District as a token of esteem on behalf of the members attending the luncheon. Each member of the party also took advantage of the occasion to pay personal tribute and express words of commendation for Mr. Logan's leadership and cooperation the past year which helped make possible a 300 per cent increase in Electrolux sales. Mr. Logan then responded in a brief address and thanked the group for thus honoring him, pledging himself to the task of doing all in his power to achieve outstanding results during 1932.

C. I. Weaver was re-elected president and general manager of the Ohio Fuel Gas Co., and other gas companies in the Columbus group of the Columbia system at the annual election held recently. E. M. Tharp was re-elected vice-president and assistant general manager of the same group.

Fred W. Crawford again was named chairman of the board of each of the companies in the Columbus group and of the Preston Oil Co., of which C. I. Weaver also is president. Besides the Ohio Fuel Gas Co., the Columbus group consists of Columbus Gas & Fuel, Federal Gas & Fuel, Northwestern Ohio Natural Gas and the Edgewater Gas & Light Companies. Together these concerns serve 324 Ohio towns and cities.

At the same time election of the Indiana Gas Distribution Corp., another Columbia organization, was held the following officers being elected: Fred W. Crawford, chairman of the board; C. I. Weaver, president; T. H. Kerr, E. M. Tharp and W. L. McCloy vice-presidents; P. A. Alberty secretary; P. A. Balliet assistant secretary; P. A. Balliet, E. D. Bivens, J. E. Parsons and N. E. Shupe assistant treasurers.

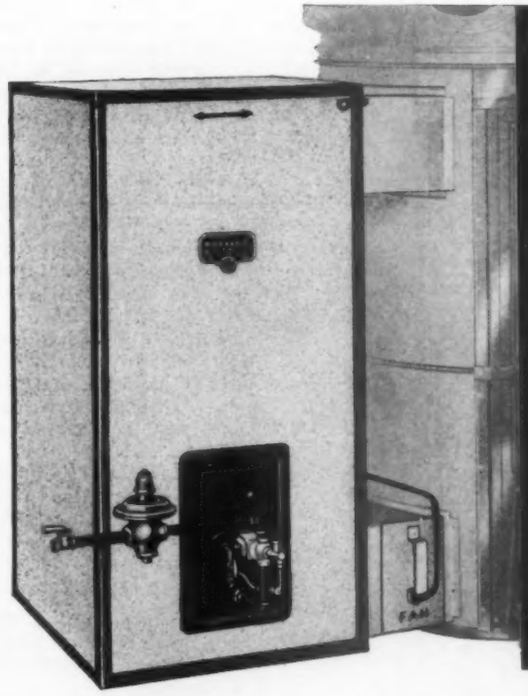
Northwestern Ohio Natural Gas Co., and Edgewater Gas & Light Co., of the Columbus group will have E. M. Tharp and C. W. Wallace, Toledo, as new vice-presidents. The secretaryship of all Columbus group companies will again be held by P. A. Alberty. Messrs. Balliet, Bivens, Parsons and Shupe were named assistant treasurers of all companies. The Columbus and Federal companies will have E. C. Sharpe as additional assistant treasurer. T. H. Kerr was again named vice-president of all Columbus group companies, and T. B. Gregory and W. L. McCloy were re-elected vice-presidents of the Ohio Fuel Gas, and H. H. Hall was re-elected vice-president of the Columbus and Federal Companies.

Henry Langston has been appointed district manager of the United Gas and Public Service Company at Marshall, Texas, succeeding W. C. Merritt who was transferred to Beaumont, Texas.

W. M. Little has been appointed general superintendent of the gas distribution operating departments of the Arkansas Natural Gas Corporation. Mr. Little will make his headquarters in Shreveport, La.

Ralph Phillips has been named engineer in charge of general gas sales promotion for the San Diego, Calif., Gas and Electric Company.

(Personals continued on page 60)



NOW!
SMALLER HOMES CAN AFFORD TO HEAT WITH
GAS

THE ENTERING WEDGE TO VOLUME GAS HEATING SALES

No longer are your gas heating prospects limited to homes of larger income. Here is a gas furnace that enables Mr. *Average* Home Owner to enjoy the luxury of gas heat *economically*—a gas furnace that appeals to *five times* more prospects—your one big opportunity for new profit.

It is the Niagara Auxiliary, a highly efficient gas furnace, installed in connection with the present warm air furnace. It provides the luxury of gas heat during the long months of spring, fall and all but the most severe days of winter. During the few short weeks of raw winter—the weeks the average home owner remembers when he compares heating costs—the coal furnace is used in the ordinary manner. The owner enjoys gas heat during 80% of the heating season at practically no increase in fuel cost. And the mid-winter "peak" gas bills are eliminated.

No matter how many lines of heating equipment you now handle, Niagara Auxiliary fits a *definite place in your sales program* as the entering wedge to the five to one larger market among homes of moderate income.

Let us tell you the complete story.

★

Installed on either side of any type warm air furnace. Ready for immediate use. Instant change from gas to coal, coal to gas, or both may be used together. Low cost, high efficiency.

★

THE FOREST CITY FOUNDRIES COMPANY · CLEVELAND, OHIO

NIAGARA
Auxiliary GAS FURNACE

H. H. Watson has been appointed general superintendent of construction, Northern States Power Company, to be located in Minneapolis. Mr. Watson for the past ten years has been in charge of the special construction department of San Diego Consolidated Gas and Electric Company.

George F. Phythian, who for several years has been in charge of construction work of The California Oregon Power Company and Mountain States Power Company, will extend his duties to include the San Diego Consolidated Gas and Electric Company.

Robert Naylor has been placed in charge of sales for the Eastern Montana district of the Montana-Dakota Power Company. He will make his headquarters at Glendive, Montana.

H. L. Snyder has been elected president of the New York and Queens Electric Light and Power Company. Mr. Snyder was vice-president and general manager of the company.

H. W. Elder has been appointed gas sales engineer in charge of large commercial and industrial installations, for the San Diego Consolidated Gas and Electric Company, San Diego, California.

Joseph Ainsworth has been placed in charge of the gas development work of the Iowa Railway and Light Corp., Cedar Rapids, Iowa.

John M. Orts has been appointed director of the safety educational department of Public Service Corporation of New Jersey. He succeeds Allison J. Van Brunt whose death occurred April 5. Mr. Orts had been assistant to the director of safety education since 1926.

In the twenty-eight years he has been with Public Service, Mr. Orts has had a steady rise.

Mr. Orts is a member of the National Safety Council, American Society of Safety Engineers and the Newark Safety Council. He has instructed thousands of Public Service employees and members of police and fire departments in many New Jersey cities in the prone pressure method of resuscitation. He has also addressed civic, fraternal and church groups in many localities on the subject of "Safety."

Mr. Orts is a native of New Jersey, having been born in Stevensburg.

E. A. Moran has been appointed Sales Manager of the Scranton Springbrook Water Service Company, Gas Division, Scranton, Pa. As former head of the Maintenance Department, Mr. Moran's promotion comes as the result of a splendid personal service record, particularly with regard to gas refrigeration.

Obituary

HALFORD ERICKSON

Halford Erickson, vice president in charge of operation, Byllesby Engineering and Management Corporation, died April 7 at his home, 426 Washington Boulevard, Oak Park, Illinois.

Mr. Erickson was born July 7, 1864, in Sweden, where he received his early education. He came to the United States in 1884.

He entered the service of the Chicago, St. Paul, Minneapolis and Omaha Railroad in 1890, serving the company in various capacities until he was appointed commissioner of labor of Wisconsin in 1895.

In 1916 Mr. Erickson became associated with William J. Hagenah in making appraisals and other investigations of public utility properties.

Mr. Erickson joined the Byllesby organization in 1918, as vice-president of Louisville Gas and Electric Company. He served in that capacity for five years. In January, 1923, he was elected a vice president and director of Byllesby Engineering and Management Corporation.

In addition to being vice president of Byllesby Engineering and Management Corporation, Mr. Erickson was vice president, director and member of the executive committee of a number of subsidiary companies in the Standard Gas and Electric Company system, as well as of Standard Gas and Electric Company, and H. M. Byllesby and Company.

FRED H. THOMAS

Fred H. Thomas, vice president and general sales manager of the Cooper-Bessemer Corporation, Mt. Vernon, Ohio, died of heart failure on Sunday, March 27th, at his home. His death followed a four months' illness.

Mr. Thomas came with the former C. & G. Cooper Company in 1907, after two years with The Babcock Wilcox Company and The United States Steel Company. For the past fifteen years he has been vice-president and general sales manager of the merged company which resulted from the consolidation of The C. & G. Cooper Company and The Bessemer Gas Engine Company.

JOHN C. D. CLARK

John C. D. Clark, for many years an active figure in the development of the gas industry, passed away on April 1st at the home of his son Horace H. Clark, after an illness of three months. He was within a few months of 70 years of age.

Mr. Clark entered the employment of the Chicago Gas Light and Coke Company in 1882.

In 1903 he went as Commercial Agent to the LaClede Gas Light and Coke Company, of St. Louis, and returned to The Peoples Gas Light and Coke Company in 1907. He left to become General Manager of the Utah Gas and Coke Company in 1911.

He remained with the Utah Company till 1916, when he went to Boston to become Sales Manager of the Boston Consolidated Gas Company; where he remained until 1927. From then till September, 1927, he was General Manager of the United Merchandising Company, a subsidiary of the United Public Service Company.

His last connection was as senior partner in the firm of John Clark and Sons, Wilmette, Illinois, in the Investment Securities business.

He leaves two sons, Horace H. Clark, partner of John Clark and Sons, and John C. Clark, vice-president of the E. F. Griffiths Company, Philadelphia, Penn.

ALBERT M. BARNES

Albert M. Barnes, president of the Cambridge Gas Light Company, Cambridge, Mass., died recently at Pinehurst, N. C

Mr. Barnes was born in 1848 in Lancaster, Mass. He received his degree of A.B. at Harvard University in 1871.

Mr. Barnes was an active member of the American Gas Association for many years and was a former president of the New England Association of Gas Engineers and president of the Association of Massachusetts Gas Companies.

ALLISON J. VAN BRUNT

Allison J. Van Brunt, director of safety education of the Public Service Electric and Gas Company, Newark, N. J., died suddenly April 5th, at the age of 59.

Mr. Van Brunt was one of the organizers of the National Safety Council and was directly responsible for the organization of safety councils in several New Jersey municipalities. Mr. Van Brunt was one of a committee who urged the adoption of the prone pressure method of resuscitation in this country. Thousands were taught this method of resuscitation by Mr. Van Brunt and every Public Service Company employee was instructed in it either by him or by one of his assistants.

Mr. Van Brunt started as an investigator in the Claim Department of Public Service in 1908. He became director of safety education in June, 1913.

GAY E. HOWARD

Gay E. Howard, Compressor Superintendent for the Panhandle Eastern Pipe Line Company, died recently.

He was employed in 1907 by the Hope Natural Gas Company at Hastings, West Virginia, as assistant engineer. In 1910 he was transferred to the Ohio Fuel Supply Company, and later to Columbus, Ohio, where he was in charge of all compressor stations. He was transferred to the Panhandle Eastern Pipe Line Company in 1930, serving as Compressor Superintendent until the time of his death.

This ROBERTSHAW DISPLAY *is ready for you!*

SPEED UP YOUR GAS RANGE SALES this simple, sure way.

Write at once for the Robertshaw full color lithographed Display. As shown above, it is just the right size to place on a range or use in your window.

With this Display in use, you automatically extend an invitation to every woman coming in or near your store to have a visual demonstration of Robertshaw oven control.

It will pay you well to use this Display, for demonstrating the Robertshaw is the best way to make a woman think seriously about a new range.

And that is the kind of sales strategy you need right now. The Display is yours for the asking. Just drop us a line today.

ROBERTSHAW THERMOSTAT COMPANY
YOUNGWOOD · PENNSYLVANIA

TRADE NEWS

Pittsburgh Equitable and Merco Nordstrom Announce an Association of Interests

Arrangements have been completed for the Pittsburgh Equitable Meter Company to acquire all the capital stock of the Merco Nordstrom Valve Company.

A study showed the sales efforts and objectives of the two companies to be along parallel lines and accordingly, decided advantages could be gained through an association of interests, since Nordstrom Lubricated Plug Valves, manufactured by the Merco Nordstrom Company, are sold in the gas, oil, and chemical trades to the same customers that are buying Emco meters, regulators and instruments from the Pittsburgh Equitable Meter Company.

This association gives each company additional manufacturing facilities,—the Meter Company securing a Pacific Coast plant to take care of a rapidly expanding business, while the Valve Company acquires manufacturing facilities for serving Eastern and Midwestern customers.

W. F. Rockwell, President of the Pittsburgh Equitable Meter Company, becomes President of the Merco Nordstrom Valve Company, and several Directors of the Merco Nordstrom Company have been added to the Board of the Meter Company. The principal executive offices of both companies will be located in Pittsburgh.

Each company is making its district offices and warehouses available to the other, so that the companies will be able to offer a much wider warehouse service to the trade.

Warehouse stocks for both companies will be carried at Los Angeles, California; Kansas City, Missouri; Chicago, Illinois; and Columbia, South Carolina, as well as several other points.

Factory warehouse stocks, to cover the territory adjacent to New York will be carried at Hopewell, New Jersey. Middlewest factory stocks will be carried at Pittsburgh, Pennsylvania, and Tulsa, Oklahoma. The factory stock for the West Coast will be carried at the Oakland, California, plant.

Sales offices will be maintained at all of the above points and also at Houston, Texas; Dallas, Texas; Denver, Colorado; Salt Lake City, Utah; Columbus, Ohio; Philadelphia, Pennsylvania; and Boston, Massachusetts. Additional sales offices and warehouses will be opened at strategic points as the expansion of business requires.

The Pittsburgh Division of the Pittsburgh Equitable Meter Company was founded by the late George Westinghouse, who was the first successful public utility operator to introduce natural gas for domestic purposes. The Merco Nordstrom Valve Company was founded by Mr. S. J. Nordstrom, who invented the sealed port type of lubricated plug valve and is responsible for the many improvements which have been made in the last fifteen years.

Robinson Heating & Ventilating Corp. Take Over A. H. Robinson Co.

The Robinson Heating & Ventilating Corporation have taken over the entire business of The A. H. Robinson Company of Massillon and Cleveland, Ohio.

This is a newly formed Corporation and will have at its head Mr. D. A. Cable of Canton, Ohio as President, and Mr. A. D. Sipp of Massillon, Ohio as Sec'y. and Treas. (formerly associated with The A. H. Robinson Company as Treas. for a period of three years). Mr. Sipp will be the active member of the firm, having charge of its business affairs. The Board of Directors is made up entirely of men who have had a wide experience in manufacturing and marketing warm air heating products, or similar products.

The products manufactured to begin with will include two grades of steel coal and coke furnaces, made in all necessary sizes; two different types of gas furnaces, each made in six different sizes; three types of warm air boosting fans all made in the necessary different sizes. In addition to these items, development work is rapidly progressing on the production of air conditioning equipment and ventilating equipment.

The main office and plant will continue to be located at Massillon, Ohio.

The Lincoln Electric Company Appoints Mexican Agent

La Consolidada, S. A., of Mexico, D. F., one of the largest steel manufacturers in Mexico, have been appointed Mexican distributors by The Lincoln Electric Company of Cleveland, Ohio.

The new Mexican representative of The Lincoln Electric Company was established in 1900 as a branch of the Isaac Joseph Iron Company of Cincinnati. The present company was organized in 1907. Officers today are Harry Wright, President; Charles G. Seifert, Secretary and Works Manager; S. B. Wright, Vice President and General Manager; and H. R. Bradbury, Treasurer. Max Wright is Sales Manager.

Facilities include a bolt and nut plant, rolling mill, cadmium and chromium plating department, spring department and equipment for the production of steel, brass, aluminum and white metal castings, babbitt metal, solder, lead pipe, sheet lead, copper and steel wire nails. The plant covers 16 acres and represents an investment of $3,000,000.

Watson Heads Link-Belt Indianapolis Plants

Mr. James S. Watson, formerly Vice-President in charge of Link-Belt Company's Dodge Works, Indianapolis, has been appointed Vice President and General Manager of both the Dodge and the Ewart Works, the company's two Indianapolis chain factories, thus succeeding George P. Torrence, who was recently elevated to the presidency.

Mr. Frank S. O'Neil, heretofore Manager of the company's Ewart Works, has been appointed Assistant General Manager of both Indianapolis plants.

Mr. C. Walter Spalding, who has been connected with the Ewart Works for a number of years, has been appointed Sales Manager of Ewart plant products.

Hudgins Appointed General Sales Manager of Cooper-Bessemer Corp.

T. F. Hudgins, vice-president and western sales manager has been appointed to succeed the late Fred H. Thomas, as general sales manager of the Cooper-Bessemer Corp.

Coming with the former C. & G. Cooper Company in 1923, Mr. Hudgins has been in charge of all sales west of the Mississippi River. He is an experienced engineer and successful salesman and is well known in the engine industry.

Mr. Hudgins will make his home in Mt. Vernon, Ohio, where the general offices of The Cooper-Bessemer Corporation are located.

Burning Gaseous and Liquid Fuels

Combustion Engineering Corporation, 200 Madison Avenue, New York, has available for distribution copies of three articles, namely, "Tangential Firing of Gaseous and Liquid Fuels," "Corner-Firing of Blast Furnace Gas" and "Combination Burning of Blast Furnace and Pulverized Fuel." In this series of articles the author discusses the recent developments in methods of firing and in furnace design, which are being successfully applied for burning gaseous and liquid fuels, either singly or in combination with pulverized fuel. Several installations are described and data given on operation. 8 pages each, 8½ x 11.

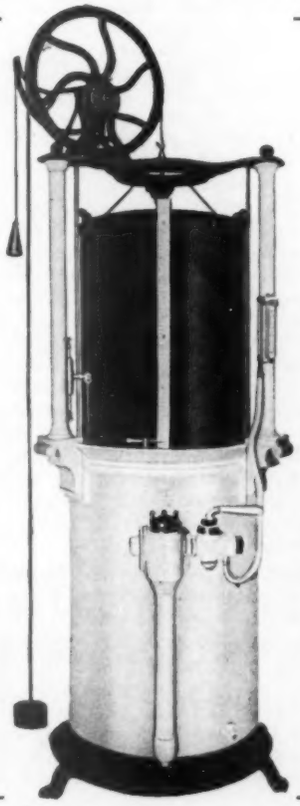
Pamphlet Describes New Refractory Brick

The Laclede-Christy Clay Products Company, St. Louis, Mo. have issued a pamphlet announcing a new refractory brick called Laclede Mullite. Resistance to spalling caused by temperature changes, ability to withstand very high temperatures without shrinking or deforming and resistance to attack of molten slags, are some of the properties claimed for this brick.

(Trade News continued on page 64)

SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs



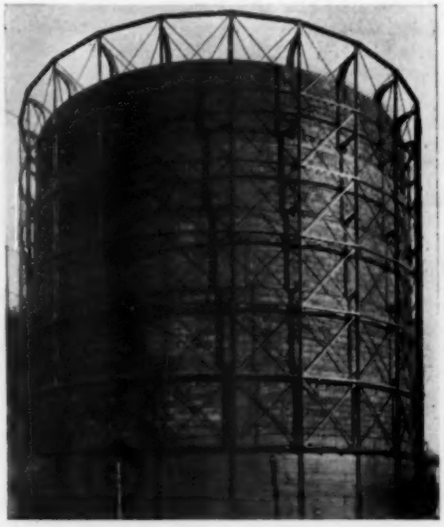
SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

GAS HOLDERS

The use of a McClintic-Marshall Gas Holder at the end of a branch pipe line insures uninterrupted service to consumers of natural or manufactured gas. A holder with storage capacity for a large volume of gas simplifies the handling of peak loads and prevents a drop in pressure in the event of a line break or other emergency.

McClintic-Marshall builds both low-pressure and high-pressure holders, in a wide range of sizes. Low-pressure, water-sealed holders of the multiple-lift type are built for any capacity. High-pressure holders, spheres and cylinders of either riveted or welded construction, are built for any working pressure.

High-pressure gas holder.



Low-pressure gas holder.

McCLINTIC-MARSHALL CORPORATION
Subsidiary of Bethlehem Steel Corporation
General Offices Bethlehem, Pa.

District Offices in New York, Boston, Philadelphia, Baltimore, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis, San Francisco, Los Angeles, Export Distributor: Bethlehem Steel Export Corp., New York City.

McClintic-Marshall

Pittsburgh Equitable Appoints Parker

Announcement has been made by the Pittsburgh Equitable Meter Company of the appointment of Walter Parker as Chief Engineer, Liquid Meter Division. Previous to his association with this company, where he has been doing special engineering work, Parker was Chief Engineer of the Fry Pump Company. His long experience in designing and building meters and allied equipment for the water and petroleum industries makes him well qualified for the position.

Parker is a graduate in mechanical engineering of North Carolina State University and served with the A. E. F. during the World War.

General Electric Earnings

Orders received by the General Electric Company for the first quarter of 1932 amounted to $33,404,642, compared with $60,366,297 for the corresponding three months of last year Gerard Swope, president of the Company, announced at the annual meeting of stockholders held in Schenectady recently.

Sales billed for the first three months of 1932 amounted to $37,876,399.05, compared with $61,959,800.90 for the corresponding period last year.

Profit available for dividends on common stock for the first quarter of 1932 was $4,508,667.85, compared with $10,844,334.09 for the same three months last year, which is equivalent to 16 cents per share in 1932 and 38 cents in 1931 on 28,845,927 shares outstanding in both periods. The quarterly dividend on the common stock, payable April 25, is 25 cents per share, compared with 40 cents per share paid a year ago.

Roberts-Gordon Issue Sales Helps

The Roberts-Gordon Appliance Corporation, Curtiss Bldg., Buffalo, New York, have recently issued an attractive broadside containing sales helps for 1932. Advertisements for a complete newspaper campaign are shown, as well as direct mail literature outlining the advantages of gas househeating.

Electrolux Activities

An average of more than two refrigerators per week is the sales record which Bailey-Cole, Inc., a dealer in approved appliances under the Brooklyn Union Gas Company established during the six months ended December, 1931.

This dealer, the leader among the dealers in the Great American Servant Refrigeration Campaign of last summer, sold fifty-nine Electrolux Refrigerators during the period. In addition, Bailey-Cole led all other dealers in number of appliances sold during the six months, totaling 64 units. Following closely behind was F. Bennett, of 9812 101st Avenue, Woodhaven, who sold 62 appliances. This latter dealer annexed the honors in range sales, disposing of 45 during the period.

For the campaign, a total of 549 Electrolux Refrigerators were sold by the dealer group, or an average of 21 refrigerators per week.

Realization of the load-building value of "all gas" restaurants by the Seattle Gas Company and appreciation of the silent operation of the Electrolux Refrigerator by the Metropolitan Building Company recently made possible one of the finest commercial installations of gas refrigeration on the Pacific Coast. As a result, not only one but three Electrolux Refrigerators are now on duty in the popular Metropolitan Tea Room.

In the kitchen, but visible to the customer, is a Country Club Model EA-20 Electrolux. This is used for general storage purposes. Placed back of the counter for the storage of salads, salad dressings, sandwich spreads, desserts with whipped cream and fruits is another Chateau Model EA-10A.

Outside the counter, and available to everyone, is an Electrolux Water Cooler. This has made the greatest hit. Nearly everyone has thought that water coolers were not necessary with the normally cool water in Seattle, but his appliance has been the most popular of all. During the warm weather many tenants in the building in which the Tea Room is located called just for a cold drink of water.

Separate units have proven a great advantage in making it possible to have the proper low temperature for the food storage and the high temperature desirable (but still well 50 degrees) for the salads and desserts ready to serve.

A novel outdoor advertising display that has caused much comment during last summer was an exhibit of Electrolux, the Gas Refrigerator, featured on the Middle Street grounds of the Lowell, Massachusetts Gas Light Company.

This bit of land adjacent to the gas company building always presents a pleasing appearance, the well-kept lawn, shrubs, flowers and vines making a delightful contrast to the commercial aspect of this downtown street. The location naturally lent itself admirably to our refrigeration display inasmuch as we tied up our advertising with the profusion of flowers surrounding the exhibit.

In the center of this space, convenient to the sidewalk, we erected a small platform about twelve inches from the ground. This was painted white with the words "Gas Refrigeration" across the front panel. Next, the Electrolux Refrigerator was placed on the platform in front of a background panel with the message "Silent as Growing Flowers" lettered over the top and flanked on each side with wickets also in white.

Chief feature of this display was the rather novel suggestion of comparison with growing flowers which were appropriately growing in their natural state nearby. At night the display was illuminated by powerful floodlights.

New Folder on Beaver Pipe Tools

Folder 232 just issued by the Borden Company, Warren, Ohio, illustrates and describes their line of new and improved Beaver Pipe Tools. Net prices are quoted for all tools listed. Copies of this folder can be obtained upon request.

EverHot Water Heater

(Continued from page 54)

bustion passes over the base of the heater, keeping it constantly cool and preventing heat loss from that point.

The EverHot Heaters are finished in a color combination of Colonial Ivory and Black Enamel. The jacket is made up of full finished cold rolled steel, the same as is used in automobile bodies and the Colonial Ivory finish is flexible—it will not crack or peel.

Descriptive literature will be mailed on request.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of American Gas Journal, published monthly at East Stroudsburg, Pa., for April, 1932.

State of New York)
County of New York) ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared S. G. Krake, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the American Gas Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Gas Journal, Inc., 53 Park Place, New York City; Editor, H. M. Riley, Plandome, L. I., N. Y.; Managing Editor, none; Business Manager, S. G. Krake, Jamaica, L. I., N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) S. G. Krake, Jamaica, L. I., N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

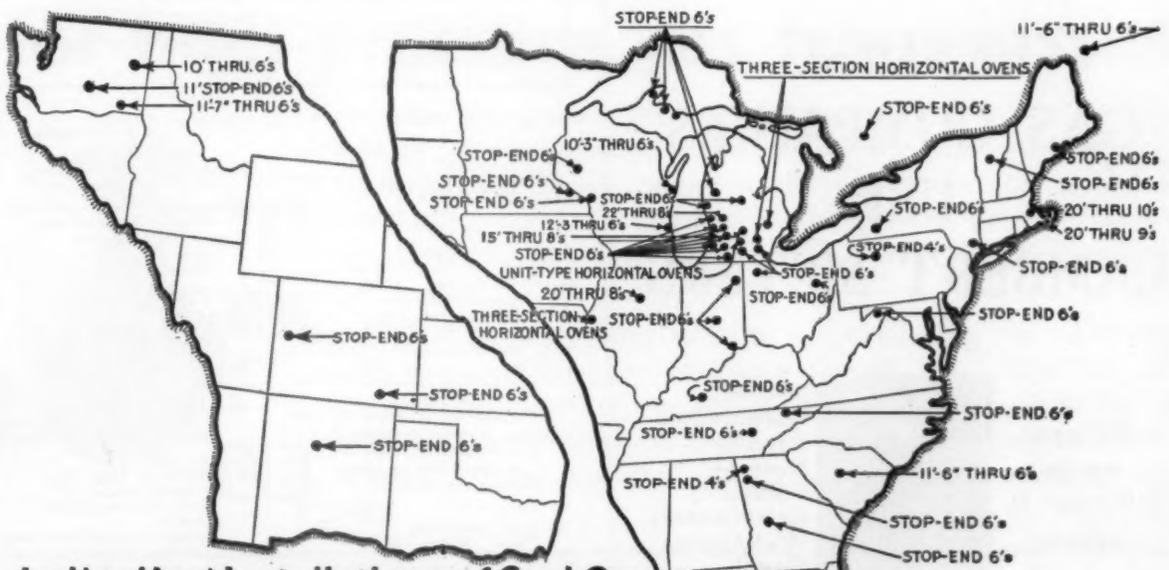
5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ——. (This information is required from daily publications only.)

S. G. KRAKE,
Business Manager.

Sworn to and subscribed before me this 12th day of April, 1932.

(Seal) ROZELLA BENNETT.

(My commission expires March 30, 1933.)



Indicating Installations of Coal Gas Generating Equipment Recently Completed by

IMPROVED EQUIPMENT–RUSSELL ENGINEERING CORPORATION

24 State Street, **Engineers—Builders** **New York**

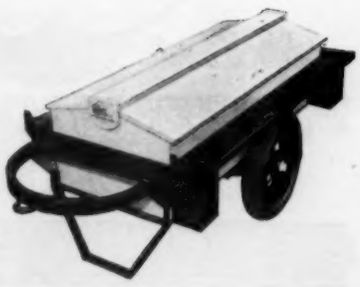
To get complete information about the HanDeeBox— Write for Bulletin G-6

Out goes the Wooden Box!

It is no trick to break into a wooden box. But just let some unauthorized person try to open the Littleford HanDeeBox! Unless he has a cutting torch, he'll have a tough time!

The HanDeeBox is built to protect tools and equipment. Your foreman can leave it on the street and know that tools are safe—even the lanterns are locked in place!

Inside the HanDeeBox is an arrangement of compartments and shelves to take care of the most complicated collection of tools and equipment. There is a place for every tool—the foreman will see that each tool is kept in its place!



LITTLEFORD BROS.

424 E. Pearl St., Cincinnati, Ohio

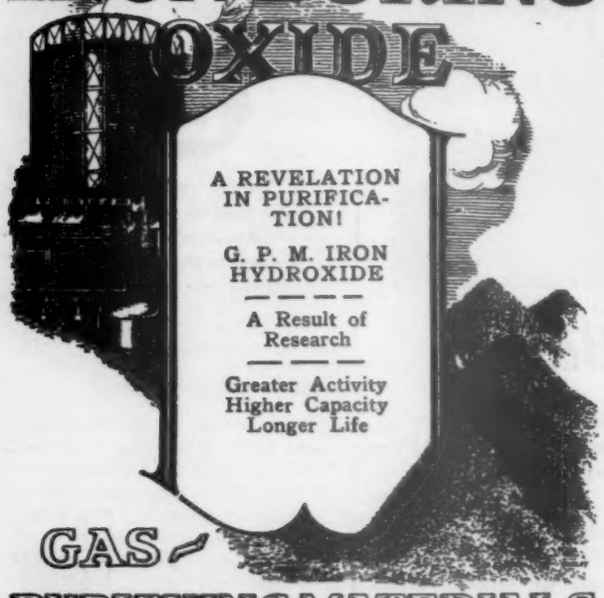
LEADING
GAS COMPANIES
USE
LAMBERT METERS

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

LAMBERT METER CO.
BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

IRON BORING OXIDE



A REVELATION IN PURIFICATION!

G. P. M. IRON HYDROXIDE

A Result of Research

Greater Activity
Higher Capacity
Longer Life

GAS PURIFYING MATERIALS COMPANY INC.

FOOT OF HALSEY STREET LONG ISLAND CITY
NEW YORK
BRANCH YARD—PROVIDENCE R.I.

TRADE CATALOGS

Published by manufacturers of Gas Equipment and Appliances for you. Order by number, using coupon on Page 74.

PLANT EQUIPMENT

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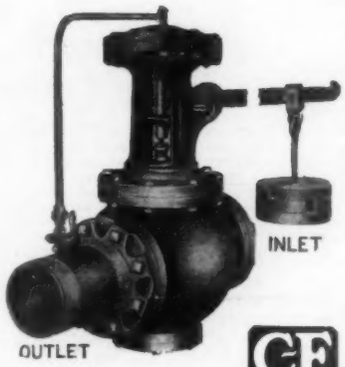

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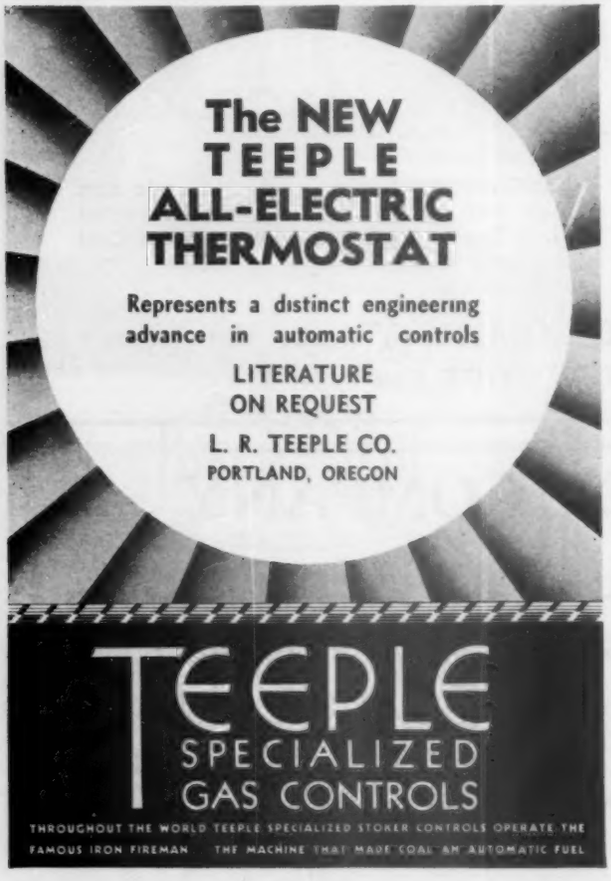

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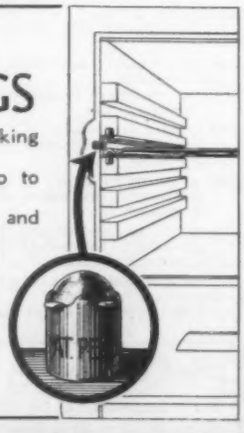

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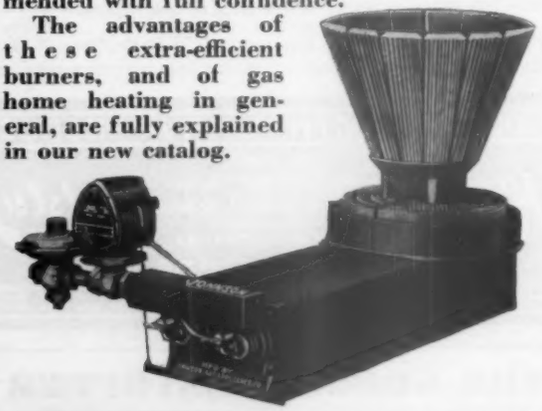

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EDITOR, AMERICAN GAS JOURNAL, 53 PARK PLACE, NEW YORK

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Intensely Active.
High Total Sulphur
Absorption at
Minimum Cost.

"THE EFFICIENT PURIFIER"

The Sponge
with the large
Tough Shavings
Always Uniform

LAVINO SPONGE

E. J. LAVINO and COMPANY - BULLITT BLDG. - PHILADELPHIA, PA.

NEW YORK CHICAGO PITTSBURGH

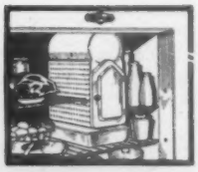
Another opportunity to popularize use of GAS

offered by the Faraday

GAS REFRIGERATOR

AUTOMATIC DEFROSTING

The Faraday Gas Refrigerator is so designed that the compact chilling unit defrosts itself, under normal operating conditions.

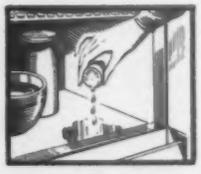


TEMPERATURE CONTROL

The Temperature Control, on the front of the cabinet, is designed so that users *cannot* completely shut off the gas through its use.

ACID-RESISTING PORCELAIN INTERIOR

Acid-resisting porcelain is used in the interior, where stains are most likely to occur. Easily kept clean by wiping with a damp cloth.

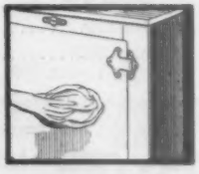


IMPROVED INTERIOR ARRANGEMENT

The Porcelain chilling unit is located so that storage space is provided on both sides. A Tilt-shelf provides space for bulky articles.

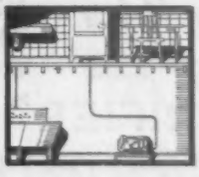
ENDURING PORCELAIN EXTERIOR

The beauty of the Faraday Gas Refrigerator is permanent. For the flint-hard porcelain surface defies heat, scratches and other hard uses.



FLEXIBILITY OF INSTALLATION

While the Faraday Gas Refrigerator is a complete unit, the absorber unit may be installed in the basement or in any small, out-of-the-way space.



LATEST PRODUCT OF GENERAL MOTORS

You are seldom offered such an outstanding value in a gas-consuming appliance . . . one with such definite possibilities for rapidly increasing the popularity of gas usage in the home.

For the Faraday Gas Refrigerator has a wonderful appeal to your gas customers. For example, it's the only refrigerator which automatically defrosts itself under normal operating conditions. This means *constant* refrigeration. There is no need for users to turn off the gas and stop the operation of the refrigerator in order to remove frost and ice from the chilling unit. And it has tremendous ice-freezing capacity . . . *nine pounds of ice at one time* . . . even in the smallest model. These advantages are typical of the many which you'll find only in the Faraday Gas Refrigerator . . . advantages which mean *easier sales* and more satisfied users.

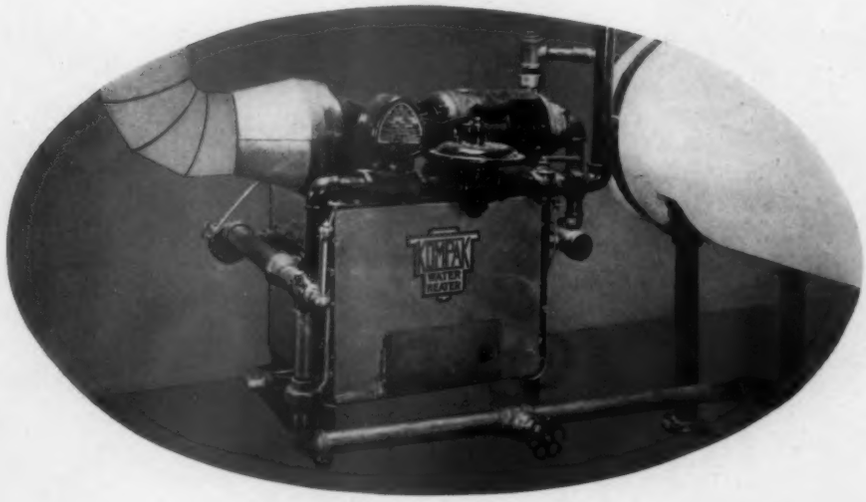
And back of the Faraday Gas Refrigerator is General Motors Corporation. This is further assurance of the value of your Faraday Refrigerator franchise. There are other facts about the Faraday Refrigerator proposition which will interest you—facts we would like for you to have. Why not write us today?

FARADAY REFRIGERATOR CORPORATION • Dayton, Ohio

THIS PAGE IS WORTH READING

TO MEN INTERESTED IN A NEW MARKET FOR GAS

THE NEW KOMPAK



530 CU. FT. P. HR.

FOUR weeks ago I announced a revolutionary improvement in the method of heating hot water in large volume—an improvement designed to secure for gas companies a class of business heretofore closed to them.

In a few words, it was the new Kompak water heater . . . only 17″ wide by 24″ long and 30″ high . . . which will heat 500 gallons an hour . . . nearly 80% efficient . . . with 1″ connections to tank . . . requiring no draft . . . and with circulation and combustion electrically controlled.

The interest shown by the gas fraternity in the first announcement was surprising. Inquiries have reached us from every part of the United States.

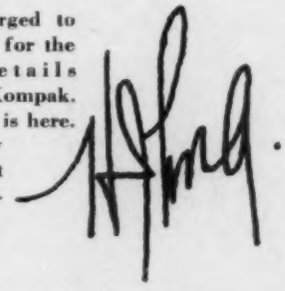
The purpose of this advertisement is to invite you (if you have not already done so) to write for all the details of this revolutionary development in automatic gas water heating.

I sincerely believe it will pay you to investigate. I have spent 28 years in the development of automatic gas water heaters, and I feel that this is one of the outstanding achievements of my life . . . one that will open up new possibilities, new markets for you.

For the first time it simplifies the heating of water in large volume economically just as the automatic storage heater simplifies the heating of water in the home.

Another feature is that the Kompak is suitable for rental to institutions which might be skeptical about the efficiency of volume water heating by gas and would therefore prefer to rent rather than invest in a new type of industrial appliance. This rental feature enables you to build your load while the prospect is being converted into a purchaser. Perhaps you remember how successfully this method was used when hotels and restaurants were first induced to adopt gas appliances.

You are urged to write today for the complete details about Kompak. The season is here. And delay means lost opportunity.



This New Kompak Also Offers Wonderful Opportunity for House Heating

THE KOMPAK COMPANY

NEW BRUNSWICK, N. J.

ACIPCO ANNOUNCES

Cast Iron

"ZEE-METAL" BOLTS

a new but thoroughly tested development which enables us to offer

100% CAST IRON JOINTS IN OUR "SIMPLEX" PRODUCTS

. . . **min. ult. tensile strength, 75,000 lbs. per sq. in.**

. . . **minimum "yield point," 55,000 lbs. per sq. in.**

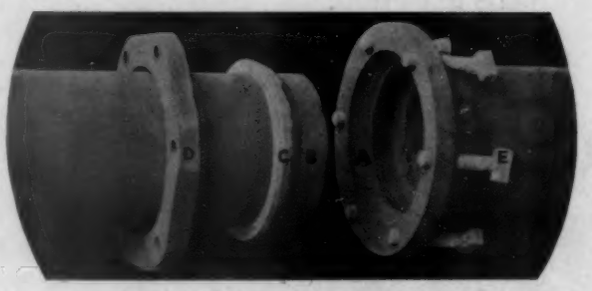
. . . **no "stretch" or tendency to strip threads**

. . . **perfect threads; specified "finger tight"**

. . . **true cast iron's *barehanded resistance* to corrosion**

Cast Iron ZEE-METAL BOLTS are ideal for use with cast iron pipe. They have been adopted as standard and unless specified otherwise will be furnished with our "Simplex" products, including:

- **MONO-CAST DOUBLEX SIMPLEX PIPE**
- **MONOLOY DOUBLEX SIMPLEX PIPE**
- **SIMPLEX PREPARED JOINT PIPE**



(A) Socket End of Pipe, (B) Spigot End of Pipe, (C) Endless Ring Gasket, (D) Cast Iron Gland, (E) Cast Iron "Zee-Metal" Bolts

AMERICAN
CAST IRON PIPE COMPANY

BIRMINGHAM, ALABAMA

SAN FRANCISCO DALLAS · NEW YORK CITY CHICAGO · MINNEAPOLIS · SEATTLE KANSAS CITY · LOS ANGELES CLEVELAND

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